CHEMICAL LIBRARY

GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

Vol. CXLII. No. 2868.] LONDON, APRIL 30, 1918. [70th Year. Price 6d.

O'NEILL'S
OXIDE
GAS PURIFICATION AND CHEMICAL CO., Ltd.
PALMERSTON HOUSE, LONDON, E.C.
Telegrams: "PURIFICATION, LONDON."
Telephone: 9144 London Wall.

EDWIN LEWIS & SONS, LTD.
Britannia & Patent Tube Works,
WOLVERHAMPTON,
Telephone No. 1147 (Private Branch Exchange).
LONDON & LIVERPOOL.
E. L. & S.
TUBES & FITTINGS.

R. & W. HAWTHORN LESLIE & CO., LTD.
In Stock.
TANK LOCOMOTIVES
Always in Progress.
Locomotive & Marine Engineers & Shipbuilders,
NEWCASTLE-ON-TYNE.

INTERMITTENT
VERTICALS.
Adopted all over the World.
Vertical Gas Retort Syndicate LTD.,
17, VICTORIA ST., WESTMINSTER, S.W.
Sole Agents for Australasia—
JAMES HURLL & CO. LTD., SYDNEY.

TORBAY
METER
ENAMEL.
The TORBAY PAINT CO.,
26/28, Billiter St., LONDON, E.C. 3.
39/41, Old Hall St., LIVERPOOL.

GAS & CANNEL COAL CONTRACTORS.
WM. F. RUSSELL & SONS.
Telegrams for all Offices: "MONKLAND."
GLASGOW: 86, Mitchell Street;
NEWCASTLE: Exchange Buildings;
HULL: Exchange Buildings, Lowgate;
LIVERPOOL: 5, Castle St.; &
SWANSEA: Atlantic Buildings.

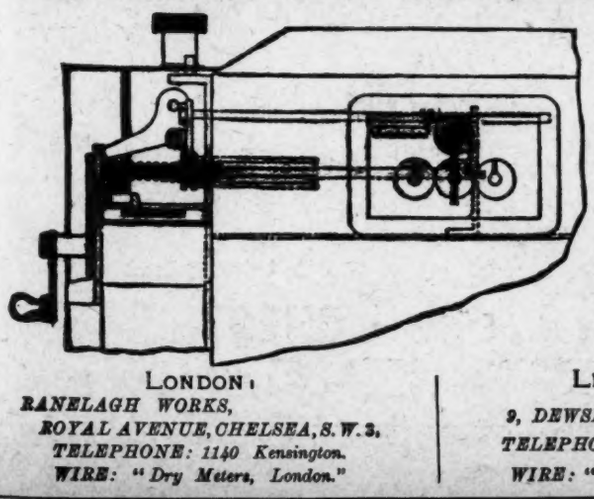
JAMES McKELVIE & CO.
Coal Owners,
Gas and Steam Coal Contractors,
17, RUTLAND SQUARE, EDINBURGH.
59, MARK LANE, LONDON, E.C.
GUILDHALL CHAMBERS, SANDHILL, NEWCASTLE-ON-TYNE.
24, CHAPEL STREET, LIVERPOOL.
ESTABLISHED 1840.

W. PARKINSON & CO.
(Incorporated in Parkinson and W. & B. Cowan, Ltd.),
LONDON & BIRMINGHAM.

(See Advertisement p. 174).

STEWARTS AND LLOYDS, LIMITED, 41, OSWALD STREET, GLASGOW. BROAD STREET CHAMBERS, BIRMINGHAM.
TUBES & FITTINGS for Gas, Steam, Water, &c.

GEORGE GLOVER & CO., LTD.,
CHELSEA.



"THE STANDARD"
SLOT METER.
THE ACME OF SIMPLICITY.
NO SPRING in any part of the mechanism.
Can be fitted with STRONG BOX, if desired, or with "M & M" LOCK.

LONDON:
RANELAGH WORKS,
ROYAL AVENUE, CHELSEA, S.W. 3,
TELEPHONE: 1140 Kensington.
WIRE: "Dry Meters, London."

LEEDS:
9, DEWSBURY ROAD.
TELEPHONE: No. 2934.
WIRE: "Meters, Leeds."

MANCHESTER:
GAYTHORN METER WORKS,
EASTON STREET.
TELEPHONE: No. 6398 City.
WIRE: "Slot, Manchester."

RITCHIE C.I. PIPES FOR GAS & WATER. MIDDLESBROUGH.

J. & J. BRADDOCK

(Branch of Meters Limited),

GLOBE METER WORKS,

Telegrams: "Braddock, Oldham." Telephone 615.

OLDHAM,

AND

45 & 47, WESTMINSTER BRIDGE ROAD,

Telegrams: "Meterque, Lamb London." Telephone 2413 Hop.

LONDON, S.E. 1.

MANUFACTURERS OF HIGH-CLASS

GAS STATION METERS.

BRADDOCK'S

STATION GOVERNORS AND RETORT-HOUSE GOVERNORS.

IMPROVED

WET & DRY GAS METERS

OF BEST QUALITY.

BRADDOCK'S PATENT

"SLOT" METERS.

FULL PARTICULARS ON APPLICATION.

ARROL-FOULIS

Stoking Machinery

HYDRAULIC COKE PUSHERS

(HUNTER and BARNETT'S PATENT.)

WILL DISCHARGE A RETORT IN ONE OPERATION

LARGE NUMBERS IN USE.

Full Particulars may be obtained from the Sole Makers,

SIR WILLIAM ARROL & CO., Limited,

GLASGOW.

LONDON ADDRESS: 56, VICTORIA STREET, S.W.

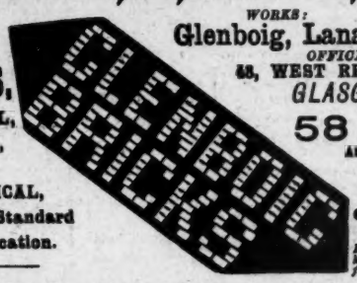
(See Advertisement, April 9, p. 38.)

THE GLENBOIG UNION FIRE-CLAY Co. Ltd.

WORKS: Glenboig, Lanarkshire.

OFFICES: 48, WEST REGENT ST., GLASGOW.

GAS-RETORTS, HORIZONTAL, INCLINED, and VERTICAL, to New Standard Specification.



58 FIRST AWARDS At International and Home Exhibitions, including Grand Prize at Brussels, 1910.

In every case the highest award given for Fire Clay Goods.

The Glenboig Bricks, Blocks, and Retorts combine, in the highest degree, the qualities of not melting, and not splitting, when subjected to the highest heats and sudden changes of temperature, and are, in consequence, found to be economical, even in districts where the local bricks can be had at half the price.

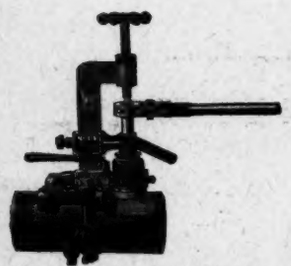
SERVICE CLAMPS, TAPPING & DRILLING MACHINES,

For Steel or Cast Iron Mains.

Century Pattern.

Every Drilling Machine unconditionally guaranteed.

High Pressure Gas Service Set.

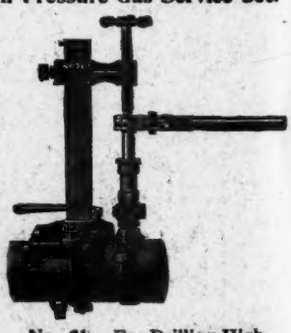


No. 14. For Tapping Dead or Live Low-Pressure Mains.

MUELLER HIGH-PRESSURE GAS COCKS, Extra heavy Type.

No. 19. For Drilling High-Pressure Gas Mains or Water Mains.

DISTRICT AND SERVICE REGULATORS.



No. 21. For Drilling High-Pressure Gas Mains or Water Mains.

Sole European and Colonial Licensees—

THE BRYAN DONKIN CO., LTD., Engineers, CHESTERFIELD.

London Office: 3, VICTORIA STREET, WESTMINSTER, S.W. 1.

Chesterfield Telephone No. 84. London Telephone No. 5358 Victoria.

Chesterfield Telegrams, "Donkin Chesterfield." London Telegrams, "Donkin Vic. London."

GAS JOURNAL

LIGHT ✂ HEAT ✂ POWER ✂ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CXLII., No. 2868.] TUESDAY, APRIL 30, 1918. [70TH YEAR.

EDITORIAL NOTES.

"Financial Hardships" Committee Meet To-day.

THE Government are not waiting until the date last fixed [May 9] for the adjourned debate on the Gas Bills before appointing a Committee to consider the question at issue regarding gas prices and dividends. The members of the Committee were selected a few days ago—their names being those mentioned in our "Parliamentary Intelligence" last week, with a single change notified in the same column this week. No time is now to be lost. The Committee meet to-day at eleven o'clock for the selection of a Chairman; and half-an-hour later they will begin to hear the case for the promoters, who will be represented before the Committee by Mr. Honoratus Lloyd, K.C., Mr. G. J. Talbot, K.C., Mr. F. N. Keen, and the Hon. E. E. Charteris. In view of the determination that a joint case shall be presented to the Committee by both promoters and opponents, the proceedings should not be of a protracted order. The Committee have to decide a question of principle, as to whether the prevailing conditions justify a temporary change in the legislative terms affecting gas prices and dividends; and therefore there is no necessity for them to go into the detail of every individual case. For the promoters, naturally the Chairman of the Executive Committee of the National Gas Council and Managing-Director of the Gas Light and Coke Company—Mr. D. Milne Watson—will give evidence. Mr. Charles Carpenter, D.Sc., the Chairman of the South Metropolitan Company will also appear, as well as representatives of Provincial gas undertakings. Mr. William Cash, F.C.A., will go into the chair to show the results of the very thorough financial investigation that he has been making. The opponents—the London County Council and various authorities in the gas-supply areas affected—will be represented by Mr. Freeman, K.C., and Mr. W. B. Clode, K.C.; and we believe that associated with them for certain of the authorities will be Mr. Bruce Thomas. It is probable that the Comptroller (Mr. H. E. Haward) and the Chief Officer of the Public Control Department of the London County Council (Mr. J. Ollis) will be giving evidence for the opposition, who have also retained Mr. W. R. Herring.

Post-War Policy.

IF all the good advice that has been tendered to the Government and the country as to the commercial and industrial policy that should or should not be pursued after the war is separated from the bad advice, and is acted upon, the nation ought ultimately to do well for itself. The like of all the investigation and the resulting condemnation and the recommendation has never been seen before. One of the Committees who have done very practical work, and whose recommendations will in most particulars be generally accepted as of a sound order, is that over which Lord Balfour of Burleigh has presided. They have been continuously giving nearly two years to the inquiry; and with the issue of their fourth report, it can be said that the Committee have done their work with genuine thoroughness, and have provided much that is of interest, and should prove invaluable to the country. The gas industry is both directly and indirectly concerned in the reports. Its indirect interest lies in the fact that its prosperity has large relation to the growth of the general prosperity of the country; while more direct interest is found in the reports in several places.

There is one pertinent matter that is not particularly mentioned in the reports; and it is that the Committee do not appear to have considered whether excessive statutory regulation and control is not partly responsible for some of the deficiencies proved to have been existent at the outset of the war, and continuing still. At the time that hostilities started, the older British industries were all showing great vitality and power of expansion. An exception, the Committee tell us, was iron and steel; and the newer branches of industry—chemicals, metals, electrical appliances, &c.—were not nearly so good. They go beyond this, and say that in the general world expansion of manufactures, Great Britain has taken a very limited share. The gas industry is interested in the prominence given to chemicals, as well as in the declaration that several branches of production of great importance as a basis for British manufactures had come to be entirely or very largely under German control and influence. In regard to chemicals, the allegation of the Committee points to an imperfection in the system that led to inadequate development in the past; yet the chemical manufacturers have had in their own hands much that has been requisite to expansion. Look how the gas industry, through Government control in regard to gas standards, has been debarred from developing to the utmost the very products that the chemical industry require; and look how the development of the economic conditions of the gas industry in regard to secondary products, and therefore of the national interests in this particular, has been interfered with by the action of the Private Bill authorities. They worked their hardest, even to the repudiation of the considered views of the Joint Committee of both Houses of Parliament, to frustrate this development. It would not have been out of place if Lord Balfour's Committee had taken into consideration the history of these obstructive tactics to the development of a statutory industry in the interests of the non-statutory chemical manufacturers, who are accused by the Committee of not having done all they might have done to promote expansion. It is partly due to the considerable non-development of the secondary products branch of the gas industry that the coking industry has been so slow (though not under statutory control) to develop the chemical products side of its business. Yet it is as obvious as anything can be that the promotion of economy in the national interests demands local schemes of treating the secondary products of the carbonization of coal, and thus supplying raw materials to the chemical manufacturers in a condition that would cause less waste in the handling and expense in the transit of the crude products.

However, the Committee have seen signs that the industries the past sluggishness of which they criticize, have been making efforts during the war to effect greater progress; and they think that the experience gained should be a valuable asset. It is hoped by us—and a Committee reporting as this Committee have done must share the hope—that the experience gained by the gas industry during the war will be fully used not only in the cause of its own expansion, but in the service of the industries dependent on it not only for raw materials but for gaseous fuel which can be realized at a cheaper rate than under the old restricted order of things. In this connection, it is noted that the subject of essential industries is dealt with in considerable detail in one of the reports. It is seen how certain of the largest British industries had come to rely upon enemy concerns for their commodities; but at the same time the Committee agree that any attempt to make the Empire self-supporting would be neither practicable nor economically sound. The latter statement must be read in conjunction with the former one. One moral of the war is that we ought to make this insular country of ours as self-supporting as possible, though agreeing that the attempt to go to extremes would not be justified in the result. Take, again,

the gas industry as an example. The war has declared that, for the protection and the trade expansion of the country, the secondary products of coal carbonization should be developed—benzol, toluol, and other things have been wanted from the industry by the Ministry of Munitions, liquid fuel by the Admiralty, and sulphate of ammonia by the Board of Agriculture; and munitions factories have been crying out for as much gas for fuel as possible. Anything that can be done to foster the production of these necessaries is important to the safeguarding of the country, in view of its insular state. All these protecting and economic developments will receive greater encouragement than before the war, if a suggestion of the Committee be adopted as to establishing a Special Industries Board, having the duty of watching the course and trend of industrial development, and of framing from time to time detailed schemes for the promotion and assistance of industries concerned with the production of essential commodities.

Now just to touch lightly on other points. It is recommended that the present prohibition of goods of enemy origin should be continued, subject to licence in exceptional cases, for a period after the war—twelve months and such further period as may seem expedient are mentioned. It is also considered desirable that State restrictions on industry should be removed as soon as possible after peace. The Committee favour industrial and commercial organization for legitimate purposes—such as prosecuting work to meet foreign competition, to secure supplies of materials, to advance production (including standardization and scientific and industrial research), and to assist marketing. Competition will no doubt be very great in neutral countries after the war. Some of the neutral countries are most anxious to get hold of British-made gas appliances. If the gas engineers of these neutral countries will describe their requirements, we will spread the information (through the "JOURNAL" columns) among the manufacturers, so that they may establish or re-establish their lines of business abroad as seem to them best as soon as possible after the war. In the establishing of trade organizations, the Committee advise that means should be devised for securing to a responsible Government Department adequate information as to their formation, with due provision for State investigation in special cases. Organizations which are nothing more nor less than "rings" are the contrary of what the Committee have in mind. The Committee are of opinion that the financial needs of British industry are likely to receive much better examination and be met in a more effectual manner under private banking enterprise than under a State controlled institution. They also discuss the bases of future fiscal policy, and give reasons against a comprehensive tariff; and in pointing out where protection is desirable, it is particularly emphasized that the "pivotal" or "key" industries should be maintained at all hazards and at any expense. The *post*-war trade policy, and therefore the reports of Lord Balfour's Committee, it will be seen, have considerable bearing on the future interests of the gas industry.

Gas Traction—A Good Report.

AN interim report has been issued by the Committee appointed by the Petroleum Executive to consider the question of gas traction. The Committee is of wonderful composition in its breadth of representation—including, as it does, gas and motor organizations, and associations interested in the professions and authorities dealing with the roads. The recommendations of a Committee of such composite talent and knowledge must command respect, and silence those childish critics who have foreseen terribly dangerous consequences from the use of gas, far in excess of anything that has been witnessed by the use of highly volatile petrol, and which critics are generally discovered to have a strong electrical bent. They will not be at all pleased with the report of the Committee, because the members of the Committee—notwithstanding the large weight of motor representation—make no secret of the fact that, economy being resident in gas for traction purposes, they are looking not only to its use as a wartime expedient, but to its more permanent employment. This is seen in the recommendation as to experiments being promptly permitted with the use of metallic cylinders. The report is in many respects both illuminating and advisory; and elsewhere to-day we give in full the findings of the Committee. Gas is found to be a practical, safe, simple, and inexpensive fuel for traction purposes. Necessity, the mother of invention, has proved more than the gas industry had ever conceded place to in their outlook. The Committee are free traders. They are not favourable to the imposition of restrictions on gas supply for this purpose other than those imposed by coal and war conditions. Charges, measurement, and standard connections are dealt with. As to the charges proposed, they are quite fair; for we have no sympathy with those who desired to frighten off this business by inflicting a heavy super-tax for filling. The proposal of the Committee is 2d. extra per 100 c.ft. for gas drawn from a filling-station (other than a private one), with 6d. per charge as a minimum. As to measurement, not long ago we were assured that rotary meters had been so much improved that they could very well be relied upon for container-filling purposes. That these meters have attained a good degree of accuracy is evident from the recommendation of the Committee that "it is desirable that the Board "of Trade should empower local authorities to test and "stamp such instruments for this purpose, provided that "they are correct within 2½ p.ct. *plus* or *minus* while capable "of passing gas." There are in the report several hints and a specification as to the construction of flexible containers, so that the report will be found of practical use apart from the recommendations as to regulations—some applying to war time, and some for as long as the economy of gas fuel is a sufficient attraction for customers.

Repair Costs of Continuous Vertical Retorts.

THERE was at one period much misgiving as to what would be the cost of repairs and maintenance in continuous vertical retorts, owing to the charges never being at rest. But much information is now available from actual experience, which declares that, with well-designed and constructed settings, if properly worked and supervised, the costs are extremely reasonable for repairs and maintenance per ton of coal carbonized. Of course, the determining factor as to costs in respect of choice is not individually capital and renewal costs, repairs and maintenance costs, and running costs, but the aggregate charges per ton of coal carbonized. But still "repairs and maintenance" cost is one of the factors, and a very important one; for the longer the duration of work without having to "let-down" for a general overhaul, the lower must be the aggregate of charges per ton for capital, repairs and maintenance, and working. When it can be shown that, in an installation of thirty-two Glover-West retorts, the cost for repairs and maintenance after 1686 days' working, with an interim stoppage for repairs, and carbonizing 122,700 tons of coal, was only 2·54d. per ton (including war-time costs for the materials and labour), the testimony is very good. This is the experience at Bradford, as recorded in a paper read by Mr. E. Gillett, before the Yorkshire Junior Association last Saturday—the installation being what is known as No. 2 house, while a similar sized installation is in No. 1 house—the former having commenced work in July, 1912, and the latter the following November; and both were let down for general repairs in 1915 and again in 1917. Up to 1915 the figures given by Mr. Gillett for No. 1 and No. 2 installation afford very good comparison; for he tells us that from the time of starting to letting-down in the spring of 1915, each unit had worked continuously. The coincidence of the time for repairs, too, is a guarantee that the costs of material and labour must have been approximately alike. The data, however, show that the unit in No. 2 house had worked 1130 days, and the cost of repairs was £318; while the unit in No. 1 house worked for 856 days and the cost of repairs was £294. Thus though No. 2 unit ran 274 days more, and carbonized 20,235 tons more, the repair charges only amounted to £24 extra. The paper does not give us any indication as to the cause for these considerable differences in working days and coal carbonized with such an insignificant difference in repair costs. Several explanations could be surmised; but they might all be wrong. The experience, however, shows the need for taking an average of costs under different conditions, if one desires a fairly safe guide; for no two units of plant could have been expected to show greater equality than those worked at Bradford. Of course, the data referring to the period up to 1915 are for the installations starting new, and the costs of material and labour were then of fairly normal order, and not vitiated by war increases. But if the 2·54d. per ton already mentioned is considered reasonably low, the comparative figures to 1915 must be described as excellent; for with the No. 1 setting the cost of repairs (we calculate) works out to 1·15d. per ton, while for the No. 2 unit with its longer period of working and heavier total quantity of coal carbonized it was only

0·94d. For the period from 1915 to 1917, the repair costs for the No. 1 unit are not yet available; but those for the No. 2 unit are included in the paper. It will be seen that the No. 1 installation up to the time of the letting-down last year from its advent in 1912 has beaten the No. 2 unit in total working days by 164—that is to say, 1850 days compared with 1686 days. The data are both interesting and instructive; but we hope that Mr. Gillett will complete them with the comparative details for the No. 1 house when the work of repair now in progress is completed.

Mr. John West and the Birmingham Medal.

News has been going round the last few weeks that the Council of the Institution of Gas Engineers had decided to recommend the name of Mr. John West for the Birmingham Medal; and everywhere that the matter has been mentioned, there has been the heartiest of satisfaction and approval. For Mr. John West is Mr. John West; and in the gas profession he has a record that is not only distinguished, but unique. Furthermore, he is the "G.O.M." of the profession—still active in the interests of the gas industry, working for progress and economy, and showing no signs of flagging, though it was but a few weeks since that his relatives and immediate friends were congratulating him upon having reached his seventy-ninth birthday, in the enjoyment of health and virility that many younger men might envy. The addition of the name of Mr. West to the short list of conspicuously distinguished men who have received the Birmingham Medal has as complete an appropriateness about it as can be imagined; for since the establishment of the award in 1881, so long as Mr. West has been without the medal, there has never been any lack of a fit recipient. It is now somewhere about half-a-century since Mr. West first of all introduced his manual retort-house machinery; and from that time to this, though he had to combat the strongest hostility of labour—hostile because of its then contracted vision—he has never been known to declare that anything he has done was sufficient for all time. His special lines of work (which from the very start put him in a state of war with conventional method) show that for him there has never been any such stage as finality in progress. Therefore every fresh step that he has taken has meant advance; every stage attained has provided the starting-place for fresh effort. The indebtedness of the gas industry and of the community to him for the economy and efficiency he has promoted is inestimable. Now he is working with might and main not only to advance the interests of the industry by bringing into it further manufacturing economy, but to assist the Ministry of Munitions and the Admiralty in the production of additional fuel oil from gas-works. However, we are glad the Council of the Institution have awakened to the fact that in the past there has been, by omission, a miscarriage of justice. Amends are being made; and at eventide there will be by one overflowing satisfaction that his life's work has been adjudged worthy of special recognition by professional brethren, among whom and for whom he has worked so long.

The Maximum Ration for Small Consumers.

There is no real minimum gas ration only for those who have exceeded a consumption of 3000 c.ft. in each of the summer quarters and 3500 c.ft. in each of the winter quarters. Such consumers need not, in their consumption under the rationing order, fall below the figures named. It is otherwise with those who in the corresponding periods with which comparison is made burned less gas than the 3000 or the 3500 c.ft., as the case may be. A correspondent points out that once or twice in the "Journal" we have spoken of a minimum below which consumers need not go; and perhaps he is right when he suggests that this is misleading, without qualification. The qualification is found in section 5 (*a*) of the order, which provides: "If the amount consumed on any premises during any quarter of 1916 or 1917 did not exceed the amounts set out in the schedule hereto against such quarter the occupier may consume in any corresponding quarter *the same amount, and no more*, as he consumed in such quarter of 1916 or 1917, whichever was the greater." Thus the consumption in the corresponding period is for the small consumers a maximum, above which he must not go; whether he goes below is a matter of choice. But in these little consumptions per quarter, there is not much room for swaying about according to atmospheric conditions; and thus the case of such consumers is really worse than that of the larger consumers.

Slot Consumers and Misconception.

Some gas companies appear to be making a muddle over the rations of the small prepayment consumers. The "Star" states that one company are stamping in red ink on the receipts given to slot meter consumers the amount which may be put into the meter next month. We are now in the first summer quarter. One example is only 5d. and another 3s. 2d. On inquiry at the office of the Company, a representative of the paper was told: "We have [in arriving at the figures] taken the April, May, and June collections of last year, deducted one-sixth off each amount, and so arrived at the present correct consumption." Now those figures of 5d. and 3s. 2d. show conclusively that the consumers could not have used 1000 c.ft. per month; and if their three months' consumption in the corresponding period of 1916 or 1917 was under 3000 c.ft., then this year (as shown in the preceding paragraph) they may consume "the same amount, and no more." To deduct one-sixth, in the circumstances, is a contravention of the terms of the order. The "Daily Express" also makes a point. Mentioning that the standard for coal rationing takes into consideration the use of gas for heating, it says: "Unless there is some proper alliance between gas and coal control, collapse must be the inevitable result."

A Gas Inducement for Household Coal Saving.

That last sentence fairly sums up our own anticipations. A large number of consumers have adopted gas heating and heated appliances during the war, partly with the view of patriotically helping to provide more benzol and toluol for high explosives, and partly with the view to save household labour. Now in order to ensure freedom from penalty for exceeding their five-sixths gas rations, they are falling back upon coal, and so defeating the Coal Controller, and injuring (at the instance of the latter) both home and war interests by reducing their consumption of gas. Household coal and gas control should be amalgamated; and the householder should be given some inducement to save coal, so that a larger supply could be sent to gas-works, in order to recover the explosives materials and liquid fuel which are so urgently required, and at the same time make available a larger supply of gas. To ensure householders saving coal, they must have some inducement, and those with gas appliances fixed would find such inducement in an idea that emanates from Mr. H. O. Carr, and is contained in a letter in our "Correspondence" columns. Briefly his suggestion is that the gas-rationing difficulty and the penalizing of gas consumers who have been economical as compared with those who have been lavish could be largely modified by permitting householders to consume 5000 c.ft. of gas in addition to the gas ration for every ton of coal allowed to, but not consumed by, them. This would be an inducement to coal saving. The 5000 c.ft. would not cost more than half the sum (say) of a ton of coal, and in some cases less than that; so that at any rate householders could get for the price of a ton of coal 10,000 or 11,000 c.ft. of labour-saving and convenient gas to take the place of labour-creating and inconvenient coal. The point is one to which the Coal Controller might give heed, in conjunction with the arguments advanced by Mr. Carr.

Cutting-off Supplies for Exceeding the Rations.

One of those stupid assumptions to which one or two sections of the Electrical Press seem to be prone appeared recently in "Electrical Industries." It stated that the gas companies proposed that they should read meters once a month, and cut-off the supply of gas from consumers who, towards the end of the quarter, showed signs of exceeding the ration. "Already the emissaries of the Gas Light and Coke Company are telling householders that the Government intends to be very rigid in the matter, and that supplies will be cut-off from houses which fail to observe the restrictions." Mr. D. Milne Watson wrote to our contemporary categorically denying that the "emissaries" of the Company had instructions to make any such statements to householders, and pointing out that, if any such statements had been made, it was due to excessive zeal. Our contemporary makes the matter worse by appending a note to Mr. Milne Watson's letter, to the

effect that he did not deny that the gas companies proposed to cut-off consumers who showed signs of exceeding the ration. Our contemporary's statement discloses it as being utterly oblivious of the law relating to the matter. Gas companies' Acts of Parliament do not provide for cutting-off supplies for exceeding any rations. There are certain obligations to give supplies; and only financial transgressions on the part of consumers empower the companies to discontinue the service. They are given no power to punish consumers who exceed their rations. The course they have to pursue is to report delinquents to the Board of Trade; and the Board then decide (after giving the consumer an opportunity to make explanation) whether the case is one for prosecution, or for the offence to be excused. Gas companies can read meters as often as the strength of their staffs permits, can inform householders as to how their consumption is going on, and can advise them. They can take no punitive steps beyond reporting excesses to the Board of Trade.

Testing Moisture in Coke.

In these days when, in the interests of the future of the coke market, a good reputation must be established for the chief secondary product, it is necessary to have a low ash content and to keep the moisture down, as well as to grade the coke for its destined purpose. Just as manufacturers now largely purchase coal on its calorific value and ash content (whether the former is of any great value depends upon the physical characteristics and the purposes to which the coal is to be put), so they will, with the spread of facilities, test the coke they purchase both for ash and for moisture. Unfortunately, just now the ash in coal is most certainly not assisting in promoting a good reputation for coke to assist it after the war. As to the moisture content, this must be brought to the very lowest attainable figure. A high ash content, *plus* a high moisture content, will be in some areas, if what we hear is true, the death of the market for coke. Gas engineers, however, have to bear in mind that manufacturers will be able to test moisture content as readily as they can do it themselves. Work has been going forward to find a simple method for this, in place of the detailed, time-absorbing ones that have had their day. In this issue, we give, from a paper by the United States Bureau of Mines, an account of investigations specifically made to ascertain a simple and rapid method whereby purchasers can determine moisture in coke. What is good for purchasers is good for sellers. It is found, as the result, that a reliable approximate determination can be made without the minutiæ attaching to the testing of coal. The tests described assured the investigators (Messrs. A. C. Fieldner and W. A. Selvig) that moisture in coke can be determined quickly, and with adequate accuracy (± 0·5 p.ct.) by simply heating to constant weight a large sample of lump coke in any convenient oven or on a stove, hot-plate, or steam-coil, at a temperature of 100° to 200° C. No air circulation, coke pulverization, or anything else is needed—this, as the tests show, being due largely to the physical characteristics of the coke.

Coalite in the Dumps.

The Chairman's address at the meeting of Coalite, Limited, last Wednesday was pitched in a decidedly minor key. This was unavoidable. All the good things predicted for the system evince a strong disinclination to mature. There seems to have been another shuffling of the cards. Low-Temperature Carbonization, Limited, who have been appointed Managers of the British Coalite Company for a decade have now had handed over to them the management of the Barnsley Smokeless Fuel Company, which it has been imagined by many was a concern distinct, compact, and independent. But apparently it is only one of the common brood. Some little time ago, we made a suggestion, in reply to a statement in one of the booming articles in the "Financier," that the Company should permit a qualified gas engineer and a gas chemist to investigate the Barnsley plant, and report (for publication) upon it and the results found, working at the temperatures preferred by the Coalite Company. Over the suggestion there has been absolute silence from the Coalite quarter. Now the Chairman says: "As to the position at Barnsley, any desired information can be obtained at the office." Of course, he only means by shareholders. But the secrecy is eloquent. It is obvious that matters are not going quite well with low-temperature carbonization. The latest smack in the face is the public announcement that the Ministry of Munitions Mineral Oil Production Department are not willing to spend money on low-temperature carbonization when they can get what they require in an easier and less expensive way, from the continuous vertical retorts of gas-works, with steaming and appropriate temperatures according to the characteristics of the coal being carbonized. The revelations too, at the Manchester Conference of which a report was published by us last week must have made the Coalite people feel as though cold water was running down their backs. We see the Coalite system is now being recommended in a series of articles in the "Financier" for bringing about a grand commercial development of coal in India. Never was system arrayed with so much virtue; never has system reputed to possess so much virtue been so long affording monetary confirmation.

PERSONAL.

Mr. George Bruce, the Manager of the Tayport Corporation Gas-Works, has been appointed to a similar position with the St. Andrews Gas Company.

Mr. J. H. Buckley, the Manager of the gas-works, has been unanimously elected Chairman of the Formby Urban District Council for the third year in succession.

The recipients of Medals of the Order of the British Empire include Frederick Innes, of Lewisham, "for high courage and resource in closing the outlet-valve of a collapsed gasholder, in which the gas was alight."

Mr. Fred. J. Jackson has been appointed Chemist to the Hartlepool Gas and Water Company (a position which was recently advertised in the "Journal"), and has taken up his new duties. He was previously Assistant Chemist at the Grimesthorpe and Neepsend works of the Sheffield Gas Company, and holds the Associateship of Arts (Oxford) and first-class honours certificate in "Gas Manufacture."

Captain Frank Ayre, Royal Warwickshire Regiment (formerly on the staff of the Birmingham Gas Department), who was reported missing from March 22, is now a prisoner of war in Germany. In September, 1914, he joined one of the Birmingham City Battalions, and received his commission in March the following year. For several months he was Adjutant of a Warwickshire Regiment Training Reserve Battalion.

The Leeds Corporation have received from the Admiralty a letter of high appreciation of the services of Mr. W. B. Leech, their Gas Engineer, who has just been appointed Engineer of the Beckton works of the Gas Light and Coke Company. Mr. Leech has been District Director of the Shipyard Labour Department in the Hull area, and of late Technical Officer and Superintendent of the Labour Section of the Shipyard Department of the Admiralty.

The Keighley Corporation have advanced the salary of Mr. W. Baillie, their Gas Engineer, from £420 to £500 per annum. It was mentioned that consideration of his application had been postponed until the result was known of the working of the new carbonizing plant. This had exceeded the Committee's expectations, and resulted in greatly increased efficiency and economy. Mr. Baillie was responsible for the design and supervision of the installation; and the whole of the work was done without expert assistance.

Mr. J. G. Hutchinson, a recent employee of the Middlesbrough Corporation Gas Department, late of the York Hussars, has been mentioned in despatches for conspicuous bravery with the 8th Machine Gun Squadron during the recent German offensive. He has been awarded the Military Medal, and promoted to the rank of Corporal. He was one of those who joined when the first call for men was made in August, 1914. This is the third Military Medal awarded to employees of the Middlesbrough Gas-Works.

Mr. William Heathcote, Chief Assistant in the Distribution Department of the Liverpool Gas Company, has been appointed Commercial Assistant to Mr. W. B. M'Lusky, Gas Engineer, Halifax. There were 53 applicants for the post (which was recently advertised in our columns), at a commencing salary of £200 per annum. Mr. Heathcote, who is 41 years of age, has been in the service of the Liverpool Gas Company for 27 years, including a regular craft apprenticeship of seven years in the Distribution and Fittings Departments. He holds the bronze medal of the City and Guilds of London Institute, and teachers' certificates in "Gas-Fitting" and "Gas Distribution."

Mr. W. J. Pickering, who has been appointed Superintendent of the Coal-Testing Works of the Birmingham Corporation Gas Department, entered the service of the Department in 1905, after being educated at the Birmingham Municipal Technical School, at which he is now lecturer in the "Gas Engineering" classes. Since 1905 he has been Works Chemist at all the five Birmingham stations, and has also worked on the cyanogen recovery plants and coal-test works. For the last three years, he has been Senior Works Chemist; and since Mr. G. C. Pearson was made Superintendent of the Windsor Street works in 1915,

he has been Acting Superintendent on the coal-test works. Mr. Pickering has been Secretary of the Midland Junior Gas Association for the last seven years, but has now resigned. At the last annual meeting of the Midland Section of the Society of Chemical Industry, he was elected to a seat on the Council; and at the annual meeting of the Society in Birmingham last year, he contributed a valuable paper on "Gas Calorimetry." Mr. Pickering, through his careful and painstaking work, and his loyalty to his chiefs and the department, has set an example which younger men have followed. His characteristic reliability will prove of exceptional value to his chief, Mr. E. W. Smith, in the important work which is carried out on the coal-test works, which consist of installations of horizontal, intermittent vertical, and Woodall-Duckham settings, having a total carbonizing capacity of about 500 tons per week. The plant has been used since the commencement of the war for important tests for the Ministry of Munitions on various coals; and at present tests on Staveley cannel are in progress for the Munitions Mineral Oil Production Department.

OBITUARY.

The death occurred recently, in London, at the age of 59, of Mr. Alfred G. Salamon. Some years ago he was Chairman of the London Section of the Society of Chemical Industry, and a Past-President of the Institute of Chemistry. He had done much work as a Consulting Analytical Chemist; and his name came before the gas industry in connection with more than one patented invention.

The death is announced of Sir Samuel B. Boulton, Bart., who was in his 88th year. He was Chairman of Messrs. Burt, Boulton, and Haywood, Ltd., which business he founded, with the late Mr. H. P. Burt, more than fifty years ago. He was also Chairman of the Dominion Tar and Chemical Company, Ltd., and took an active part in promoting scientific methods in chemical and other industries. In 1884, he received the Telford Medal of the Institution of Civil Engineers.

Mr. Frederick Kent, the Manager of the Worksop Gas Company, has been found hanging in the greenhouse at his residence. He had not been well for several months, and had received medical attention. He was 56 years of age, and was highly respected in Worksop and district. At the inquest, it was stated by the Managing-Director of the Company (Mr. H. Bannister) that there was no trouble of any description between the deceased and the Company; and the relationship between Mr. Kent and his staff had been of the most cordial character during the whole of the twenty-nine years of his connection with the undertaking. Deceased had suffered from nervous debility; and the Jury returned a verdict of "Suicide while of unsound mind."

Captain Eric Stuart Dougall, M.C., R.F.A., who was killed in action on the 14th inst., aged 32, was the only son of Mr. and Mrs. Andrew Dougall, of Tunbridge Wells. He was educated at Tonbridge School and Pembroke College, Cambridge; and after four years' training under Mr. A. G. Lyster, Chief Engineer of the Mersey Docks and Harbour Board, he went out to the Bombay Port Trust. In January, 1916, he obtained leave of absence to return to England and apply for a Commission, and in July was gazetted to the R.F.A. (Special Reserve). He at once proceeded to France, where he saw much service on the Somme, and later in the Ypres district. In May, 1917, he was promoted to the rank of Acting-Captain; and in June he won the Military Cross at the battle of Messines. The Adjutant writes: "A finer man never lived; and his place in the Brigade can never be filled. . . . He was in command of his battery at the time of his death, and for the past week had been performing the most gallant work." The Chaplain, writing later, says: "Captain Dougall was hit by a shell, and died instantaneously. . . . Seldom have I met an officer who commanded such unbounded devotion from his men and unqualified admiration from his fellow officers; and I always considered that in him was found the most perfect example of a 'man' in the highest sense of the term. I understand that several days before his death he had been specially recommended for his coolness and presence of mind in a very trying position, when he rallied the infantry who had fallen back on his guns, and inspired them with a confidence that enabled them to attack and beat back the enemy."

Substitute for Coal Gas in Laboratories.—In the "Zeitschrift für Angewandte Chemie," an advertisement appears of the Benoid gas-producer, to provide a substitute for coal gas in laboratories.

Refractory Materials Section of the Ceramic Society.—On Tuesday and Wednesday, the 14th and 15th prox., the fourth meeting of the section will be held in the Mappin Hall of the Sheffield University. The President (Mr. W. J. Jones, of the Ministry of Munitions) will be in the chair; and a number of communications will be submitted—among others, a paper by Mr. J. P. Leather, on "Refractories in Gas-Works from a User's Point of View." The Hon. General Secretary (Dr. J. W. Mellor) will present the first report of the Committee on the Standardization of Methods of Testing. On the Tuesday evening, there will be a dinner at the Grand Hotel; and in connection with the meeting several works visits have been arranged.

PERMITS FOR GAS-BURNERS.

The following letter, dated the 23rd inst., has been received by the National Gas Council from Mr. G. W. H. Wilson, Deputy-Controller of the Priority Department, Ministry of Munitions of War.

I am directed to inform you that questions have arisen with the manufacturers of gas-burners as to the permits required for these when ordered by gas companies or undertakings.

The position is that the gas companies hold maintenance and upkeep permits, and under these are entitled to the supply of burners, or parts thereof, required for the maintenance of their own property. Where the gas undertaking are doing a retail trade in burners, their requirements for this purpose may not be purchased on a maintenance permit, but must come from the ration of free material that has been provided for the manufacture of gas-burners. In other words, burners and parts of burners for use may be ordered on the maintenance permit; burners for sale must come out of the free ration.

May I ask you to be so good as to communicate this information to the industry through the Technical Press?

ELECTRICITY SUPPLY MEMORANDA.

In the multitude of "facts" that are presented to show the relative advantages and costs of gas and electricity, laymen considering them must often be mightily perplexed, as they have no means or rather knowledge to test their accuracy.

Buying B.Th.U.

But there is one thing the purveyors of electricity never do—that is tell plainly present or prospective consumers the relative heating power that they can realize for a given price by the two labour-saving forms of heating agents. From a trading point of view, perhaps they are wise in their obfuscatory methods; but it is open to their competitors to furnish figures which can be proved both by scientific means and actual use. The proof leaves gas a long way ahead of electricity in the value it gives as a heating agent, and not a great way behind coal, but *plus* labour-saving, the dispensing with storage, the regularity of heating, and the ready means of adjustment to requirement. In the address which Sir Robert Hadfield, Bart., F.R.S., delivered to the Society of British Gas Industries the week before last, he quoted some figures prepared by a gas engineer, of which even an electrical engineer could not say anything worse than that they "are correct as mere statements of relative potential energy." First of all, figures were quoted by Sir Robert supplied to him by Prof. Bone, which showed that £1 would purchase in the form of coal (at 30s. per ton) 20,000,000 B.Th.U., in the form of gas (at 2s. 6d. per 1000 c.ft), 4 million B.Th.U., and in the form of electricity (at 1d. per unit) 825,000 B.Th.U. In use, allowing percentage losses of 60 in the case of coal, 20 in the case of gas, and 10 in the case of electricity, the consumer gets for his £1 sterling 8,000,000 B.Th.U. from coal, 3,200,000 B.Th.U. from gas, and only 750,000 B.Th.U. from electricity. Coal is reckoned at 13,500 B.Th.U. per lb., gas at 500 B.Th.U. per cubic foot, and electricity at somewhat above its rightful claim of 3420 B.Th.U. per kw.-h. The figures for electricity should be respectively reduced to 820,800 B.Th.U. and 738,720 B.Th.U. Again, in the case of coal, there are not many household grates that will show a loss of only 60 p.ct.; and household coal fires suffer from the facts that they take some time to reach an incandescent state, and that their regularity as heat givers is much impaired by the vagaries introduced by "stoking," from which a gradual ascent is made to their best heating pitch, but from which "best pitch" there is a gradual decline until "stoking" is again necessary. The coal fire therefore presents a zig-zag line in heating value.

Weakness Reflected in Comment.

The gas engineer in his figures just about halved the buying costs of coal, gas, and electricity. Consequently, the B.Th.U. delivered per £1 are just about doubled. There is nothing therefore special in them. But these were the ones submitted to the electrical engineer. His comments are interesting, but not convincing. They are three. He says the gas engineer takes no account of: (1) The relative efficiencies of the appliances for using coal, gas, and electricity. (2) The relative cost of labour in connection with them. (3) Rent of space, repairs, maintenance, establishment expenses, and interest on capital outlay on plant. Both gas and electricity are fighting coal as a heating agent—gas leading in the fray. Thus, so far as we are concerned, the question is as between gas and electricity. Now as to No. 1, it is evident that Sir Robert did not submit to the electrical engineer Prof. Bone's deductions for losses. If he had done so, the electrical engineer would have had to appraise Sir Robert's intelligence at an extraordinarily low level if he thought he would be satisfied that the difference between Prof. Bone's net figures of 3,200,000 B.Th.U. for gas and 750,000 B.Th.U. for electricity could be wiped out by a vague, inconclusive electrical commonplace, suggesting that consideration of relative efficiencies would adjust the difference, if not produce electrical superiority. The comments that were made are by no means a compliment to such a man as Sir Robert. Then as to the labour connected with gas and electricity. What is the

difference between the expenditure of labour? Is it not worth the striking of a match to get (say) in room heating an additional value of 2,500,000 B.Th.U.? As to the third point, What is the difference between the space required for gas and electricity heaters? As to repairs and maintenance, in a gas-fire there are the fireclay radiants; but, in an electric-heater, there are the far more expensive heating elements. In gas-cookers there is nothing needing repair or maintenance to compare with the heating elements. As to establishment expenses and the interest on capital outlay on plant, we do not know exactly what this means in this particular connection. What we do know is that with heaters, the electricity variety is far more expensive than the gas variety. We are glad that Sir Robert Hadfield included these comments of the electrical engineer (who by the way is described as a "leading" one), as, comparing gas with electricity, they indicate weakness, and a despairing use of *camouflage*.

An Acknowledgment.

In respect of that fraudulent claim of electricians that there is a great saving in the shrinkage of meat contrasted with gas operation, we have always maintained that it is all a question of the temperature at which the cooking is done. With electricity, baking can be carried out at high temperature just the same as it can be with gas; and with gas it can be carried out at low temperature just the same as it can be with electricity. In "Cooking and Heating Notes" in the "Electrical Times," the writer makes an acknowledgment which we do not remember having seen him make before. He says: "Food should be cooked slowly and eaten slowly; but we have often pointed out that the present generation has been brought up with the gas-cooker, the popularity of which to a large extent is due to the rapidity with which it appears to cook food. People have become accustomed to regard food so prepared as properly cooked, and to eat it far too quickly. It is possible, of course, *to cook food as rapidly by electricity as by gas, but by so doing it is more or less spoiled in the process*. Those who prepare their meals slowly and thoroughly by electrical means obtain the maximum benefit from the food, particularly if it be eaten slowly also." The italicized words go to the root of the whole matter. The saving in shrinkage of meat is gained by electrical experts or those out to show a saving by low-temperature electrical cooking and high-temperature gas cooking. Similarly with the gas-cooker, it can be regulated-down to show an equal saving over high-temperature work with the electric-cooker. But cooks are cooks; and if they are servants and not members of the family, then they will not be over-scrupulous as to temperatures or meat savings. Their object is to get through their work as quickly as possible. The italicized words show what a sham and a fraud has been the electrical boast as to saving of shrinkage. Such trickery to get custom is not anything over which honest men would be proud.

War Conditions and Supply Contracts.

The "Electrical Review" has had a special article from its "Legal Contributor" on "The War and Charges for Electricity." The writer refers to the powers of the Board of Trade, and alludes to the importance of the Courts (Emergency Powers) Act, 1917. The provisions appear to give some relief, which is apparently additional to, and not in substitution for, that which the Board of Trade can give. The Act only applies to cases of hardship caused by the operation of the Defence of the Realm regulations, or the acquisition of property by the Crown; and it is made to apply especially to any obligation relating to the supply of (*inter alia*) "heat, light, traction, or power arising under any Act of Parliament." The writer of the article says that, after considering the circumstances of the case, and the position of the parties to the contract, and any offer which may have been made by any party for the variation of the contract, the Court may (in the case of a contract for light, &c.) suspend the contract, or stay any proceedings for the enforcement of the contract, or any term thereof, or any rights arising thereunder, on such conditions (if any) as the Court may think fit. An ordinary contract may be "annulled or suspended," while a statutory contract for light, &c., can only be "suspended." Assuming it could be shown that an ordinary consumer's contract, owing (say) to some Defence of the Realm regulation, could not be enforced without serious hardship to a company, it is not very easy to define the exact powers of the Court. No power to vary the terms of the contract is given. A Judge could not say: "You may increase your price to 10d. a unit." But if the consumer, realizing that, owing to difficulty in obtaining coal, the company were unable to supply on the statutory terms, were willing to pay 10d. "during the war," it is apprehended that the Court might then suspend the statutory contract. Anything which affects the supply of fuel or labour must, in the long run, influence cost of production; but it remains to be seen whether the Judges would so construe the section that increased cost of production, unless clearly shown to be due to some specific regulation, affords any ground for relief. We should like our contemporary's "Legal Correspondent" to note that the French Courts have a much better way of dealing with this matter. In the case of gas contracts, all the Courts—latterly the Appeal Court [*ante*, p. 17]—have admitted the legal efficacy, in annulling or modifying pre-war contracts, of new conditions of so exceptional a nature that they did not come within the prevision of either party to any such contract. They hold that the war has introduced such circumstances that the equity of such contracts has been completely upset.

Charges and Dividends.

Electric supply companies, not being under a sliding-scale of price and dividend, are able to maintain the latter by putting up the former as high as they like, so long as it does not exceed the maximum allowed in the Provisional Order or Act of Parliament. The times have allowed them liberty in the matter. Gas has had to go up heavily through coal and labour costs and controlled prices of secondary products. Competition, too, has had its wings clipped by the scarcity and price of both material and labour. Therefore in regulating their prices, electric supply companies have not the same considerations as applied in pre-war time in determining the question of price. At Newcastle-on-Tyne they are proposing to kick against increased prices for current while high dividends are being paid. The Parliamentary Committee of the Corporation have dropped on to the large profits of the Newcastle Electric Supply Company and the payment of 8 p.ct. dividend, with in view a proposed increase of charges to the extent of 20 p.ct. for lighting, and 15 p.ct. for heating. They do not consider, placing the proposed increase in price and the amount of the dividend side by side, that the latter justifies the former. It is therefore suggested that application be made to the Board of Trade for a reduction of the charges, which is the precise opposite of what the Company want. A departmental investigation is also asked for in the case of the Newcastle and District Electric Lighting Company, Ltd., who are making a similar advance of their charges.

Mr. Seabrook Answers a New Call.

The announcement is made that Mr. A. H. Seabrook has resigned the position of General Manager of the Marylebone Borough Council electricity undertaking, in order to take up a position of national importance described as a "pioneer enterprise of great promise dealing with coal conservation and power production." The intelligence will come as a shock in electrical professional circles, in which Mr. Seabrook has been one of the most progressive leaders, although the schemes that he applied to Marylebone were not universally regarded as applicable to other areas. He has been a strong believer in having at hand a bevy of tariffs designed to meet all sorts of situations and conditions. Many of his best friends often suspected that, in framing these tariffs, he was emulating the spirit of the old showman who was content if what he lost on the swings he gained on the roundabouts. Even if some of these tariffs brought no particular good in the shape of profit to the concern, they were—Mr. Seabrook winks his eye and smiles with pleasure over the thought—a thorn in the sides of gas competitors, though, of course, they knew well enough that there is a limit to the application of tariffs that bring little or no direct profit. We have occasionally crossed swords with Mr. Seabrook; and our relations are such that in all sincerity we wish him "Good luck" in his new position, whatever its exact duties may be. As mentioned in the "Journal" last week [p. 129], he is leaving to his successor a second string to his fuel bow in the shape of coke-breeze for boilers.

Decimal Coinage.

The question of decimal coinage is just now being stimulated with considerable fervour by those who believe in it, and who know that its adoption would be followed by the introduction of metric weights and measures. The gas industry would have no particular care about the matter, if it did not involve grave disturbance of the prepayment branch of their business. On behalf of the Associated Chambers of Commerce, a Bill has been prepared, for consideration by the House of Lords, with the object of giving effect to the change. But Bills of this kind have a way of being introduced, shelved, and then appearing again in succeeding sessions, until at last perhaps something is done. At present there is a sharp division of men's views on the subject. This is seen in two reports that have lately been issued. The Committee appointed to inquire into the position of natural science in the educational system remark: "So far as education is concerned, the introduction of the metric system would be attended with great advantages. Arithmetic would be much simplified, and time saved. The present chaos of English weights and measures causes waste of time and confusion of thought; and there are strong educational reasons for the adoption of the metric system." On the other hand, Lord Balfour of Burleigh's Committee on Commercial and Industrial Policy after the War are unable to recommend for adoption in this country the metric system or decimal coinage. It is understood that some of the influential members consider that the system of decimal coinage is not destined to bind together the different parts of the British Empire, and that something like the American dollar is more calculated to unite the English-speaking peoples of the world. Which views will the Government favour?

The Society of British Gas Industries.—A vacancy having occurred in the Chairmanship of Section 1 (Retort Setters), in consequence of Mr. Fred. J. West, who was elected by ballot, being unable to accept the position, owing to pressure of important Government work, Mr. Charles S. Bennett, of Messrs. Gibbons Bros., Ltd., who was second in the list, has been elected Chairman of the Section for the current year.

SIXTY YEARS AGO.

[From the "Journal" for April, 1858.]

Reckless Competition.—There is no principle of action more popular in this trading community than competition, as opposed to monopoly. "A fair field and no favour" is a maxim dear to every Englishman's heart; while any semblance, even, of monopoly excites a feeling of dislike. Hence it is that opposition to established interests is so often hailed with pleasure; that competitive examinations, in which all are supposed to have the same chance, are so strongly supported by public opinion; and hence, also, the odium which more or less is attached to patented inventions. It seems strangely inconsistent, indeed, that in a country where certain hereditary and conventional monopolies are held sacred, there should exist so strong a feeling against any approach to trading monopoly; and that, while it is considered a violation of public faith and common honesty to attack some vested interests, there is a lax morality, approaching a spirit of spoliation, as regards other vested interests, that have equal claims to be respected, and by the maintenance of which the public are directly benefited. The spirit of competition seems inherent in the national character.

Slate Quarry Lighted by Gas.—The slate quarry at Festiniog, Merionethshire, has just been successfully lighted by gas. . . . Outside the principal tunnel a miniature gas apparatus has been fixed, consisting of a 10-in. ⌂ retort, 4 ft. 6 in. long, the flues being so adjusted that it will heat in a few hours; and, by an arrangement of dampers, the retort can be heated at any part required. The condenser is annular, 6 ft. long; the outside cylinder 9 in. diameter. The scrubber is of the same size as the condenser. The purifier is in two compartments, each 2 ft. square; and the gasholder is 15 ft. diameter by 8 ft. deep. The gas is conveyed by a 1¼-in. pipe through a tunnel 800 yards long, where there is a branch at right angles of about 120 yards long and 1¼ in. diameter. Further on, in the same tunnel as the first, there is another branch of 250 yards of 1¼-in. pipe, which is then carried 42 ft. higher to an upper level, and again to a similar height to another level for lighting caverns in both levels. . . . The pipes are fixed by hooks to the rock, let into wooden plugs. The burners in the tunnels are fixed; but in the slate openings or caverns universal joints are brought into use, as well as vulcanized india-rubber tube with moveable stands, which enables the workmen to move the light where they may desire.

CRIMINAL WASTE.

[Communicated.]

Prof. Braine's estimate of our coal resources at 186,153 million tons is about correct; but probably it does not take into consideration the question of accessibility. Long before one-half of this amount was exhausted, the coal would be so far off in the earth that the probability is it would not pay for working. The price would be prohibitive of its utility. At the same time, the whole country is greatly indebted to the learned Professor for calling attention to this all-important subject, and to the abominable and criminal waste that is now going on.

It is clear that, unless we alter our ways, and that soon, we shall deserve to perish as a nation; for we are sinning against light and knowledge. The very scientific and exceedingly praiseworthy efforts of Mr. George Helps, of Nuneaton, in the direction of economy, stand out in bright contrast to the general lethargy and indolence upon this great and vital question. It seems as though our great municipalities, instead of encouraging all such efforts, are doing their best to damp the ardour of investigators and pioneers. In London, the chief educational authority is the London County Council; and yet they are the most backward in the whole country in the encouragement of the most necessary and practical science. It is estimated that during the last thirty years they have lost for the London ratepayers no less than £15,000,000 in the unscientific and barbarous way in which they have thrown away the London sewage, instead of turning it as they might and ought to have done into a profitable fertilizer for the land. If they have ignored the prime duty they were established to perform, how can they expect to be listened to when they oppose the most necessary measures in Parliament for the efficient working of the gas industry? Surely they have to put their own house in order before they can be heard to dictate to the gas companies.

A period of war and great public anxiety and calamity is not the time for any municipality to seek for an increase of power. Their duty is to exercise the authority they already possess for the public good, as pointed out by the laws they have to administer, rather than to magnify their office by extending their jurisdiction. If the Automobile Club can offer a prize of £1000 for the best gas-bag for driving motors, it is quite as easy for the London County Council to offer prizes for plans for utilizing the waste heat from the gas-works for evaporating the sludge and turning it into a dry and portable fertilizer. By this means, the lowest estimate is that the ratepayers would make £540,000 a year by the sale of it; while the gas companies would at the same time be relieved from their present distress, and be able to supply the public with gas at a lower figure.

At Manchester, such a fertilizer sells for £2 5s. per ton. At Walthamstow, all the District Council's sludge is used on the surrounding farms. At Wimbledon, it is pressed into cake and sold. At Glasgow, Liverpool, Leith, Luton, and Leeds, similar schemes are in vogue; while in London nothing of the sort is done, though as long ago as 1865 and 1866 two Acts of Parliament were passed under which the old Metropolitan Board of Works got a deposit of £50,000 from the contractor, and were bound to deal scientifically and profitably with the whole of the sewage. A shameful conspiracy on the Stock Exchange killed both of these Acts; and the Board forfeited the £50,000, after keeping it for over twelve years "in suspense." Nothing was done. In 1878, the "Princess Alice" went down in the Thames at Plumstead; and over 700 persons were drowned or suffocated in the sewage. In 1884, a Royal Commission, after spending many thousands of pounds, reported in favour of the sewage being dug into the land. This was ignored; and the present vile and ungodly system of sending the sewage into the mouth of the Thames by sludge-ships was inaugurated. The men who began this iniquitous and prodigal practice have a great deal to answer for; but most of them are now dead.

It is for the London County Council to turn over a new leaf, especially as their sludge-ships are liable to be blown up by the enemy submarines. A very low estimate has been made of the effect of the fertilizer on the lands of the Home Counties; and the result is that it would double their fertility, and give London alone an extra supply of food from the farms and market gardens worth over £1,000,000 a year. Is this to be lost at such a time as the present? Is Parliament going to turn a deaf ear to the cry of the hungry and to the poverty of the needy? Is the Government going to allow itself to be deceived by the glamour and splendour of military achievements, and not going to the root of the country's strength and prosperity? Like the Prodigal in the Parable, it has wasted too long "its substance in riotous living." Now have come the bitter tears of repentance and sorrow; and it is time that the chastening hand of affliction and want should be treated with respect and reverence.

In Mr. Cotton's very able lecture published in the "Journal" for March 26, he seems to refer as a difficult problem to the profitable disposal of the coke or carbonaceous residue left from 20,000,000 tons of coal distilled for oil for the Navy. In reality, it is no problem at all. Even if the whole 280,000,000 tons produced were distilled at the pit's mouth, there would be a profitable use for all the coke and sulphate of ammonia. The land can take all not required for domestic or manufacturing purposes. About 2 cwt. of sulphate of ammonia, costing 30s., could be mixed with a ton of powdered coke costing 15s.—together 45s. Five tons of this mixture, costing £11 5s., could be spread over every acre of the land while ploughing with a motor, and in this way would be cheaper than horse or cow manure, while its efficiency as a fertilizer would be more than double. In fact, it is stated on very good authority that, by such agricultural aid, together with dried and powdered slag, the soil of the whole of England could be made to produce double what it does now, and so render the country independent of any foreign supply. The oil and gas obtained would be more than enough for all naval and manufacturing purposes, while the tar would more than suffice for all the roads. In fact, so great is the public interest now being taken in this subject, that the following questions (among others) are being put to different members of the Government and both Houses of Parliament.

Are you aware—

1.—That out of 280,000,000 tons of coal taken out of the earth in Great Britain, no less than 100,000,000 tons are wasted from the defective manner in which it is burnt?

2.—That by burning it in open grates nine-tenths of it go up the chimney and defile the atmosphere?

3.—That by distilling as much as possible at the pit's mouth gas, oil, coke, tar, electricity, sulphate of ammonia, and explosives could be produced in quantities sufficient for all the country's present requirements?

4.—That the sulphate of ammonia so produced would double the fertility of the soil of the whole country?

5.—That the oil so produced would supply all the oil required for motor vehicles in this country?

6.—That the tar so produced would repair all the roads in this country?

7.—That the waste heat from the gas-works would be more than sufficient to convert all the sewage of the country into a profitable fertilizer for the soil?

8.—That the coke so produced would be more than sufficient for all manufacturing purposes, including the manufacture of cement, which, as now, could be exported at a profit to all the world?

9.—That the collective profit to the country of this economy after the war would be so great that it would enable it to pay off 2000 millions sterling of the public debt within thirty years?

10.—That with the sulphate of ammonia and the sewage together, the productivity of the soil would be so great that the country would be self-supporting, and not dependent upon any other country for its food?

11.—That the atmosphere of London and all the great cities being free from smoke, would be as beneficial for child-life and plant-life as the open country or the seaside, which the poorer classes are never able to visit?

12.—That the cost of cleaning windows, curtains, ceilings, walls, clothes, and furniture, made dirty by the smoke, comes to many millions annually?

13.—That by planting waste and unoccupied lands with trees, this country could get a revenue of £9,000,000 a year, and in time obviate the necessity of importing any foreign wood whatever?

14.—That tropical hot-houses could be established near gas-works, and at every pit's mouth, in which all tropical fruits could be grown as good as those imported from abroad?

15.—That by the canalization of our rivers we could breed more than enough fish for the whole country, including trout and salmon?

16.—That traction by electricity does not pay, and that by motor omnibus does; and therefore tramways ought to be abolished in favour of motor omnibuses, which could be driven by oil produced in this country both from coal and sewage, as well as from millions of tons of waste-heaps of shale?

17.—That the London County Council propose to spend a million sterling on a public hall for themselves, while they leave the vital question of the sewage, which they were formed to settle, unsettled, and the construction of dwellings for the poor unprovided for?

18.—That, in consequence of not cleaning the coal as before the war, no less than 5,500,000 tons of dirt are shipped, thus depriving the country of this amount of shipping per year, which might and ought to be used for shipping supplies of food to this country?

19.—That the coal could easily be cleaned as before by the female labour now being discharged from the munition works?

20.—That no less than 152,000 tons of cinders are thrown away every year by housekeepers in London into their dustbins, which might and ought to be burnt?

21.—That in 1882 the average price of coal at the pit's mouth was 4s. 6d. per ton; that just before the war it was 12s. per ton; and that now it is over 20s. per ton?

22.—That though it is estimated that there are over 186,153 million tons in our coal mines, yet long before one-half of this is exhausted, the cost of extraction will render its use prohibitive?

23.—That there are over 77,000 square miles of coal in Canada; and this alone is likely, within the present century, to make that country the chief home of the English race?

THE GAS INDUSTRY AND THE WAGES QUESTION.

By Thos. Newton.

The growing solidarity of organized labour is reflected in the repeated applications for increases of wages, war bonuses, and improved working conditions generally. A period of abnormal industrial activity resulting from an unlimited demand for commodities has somewhat reversed the *rôles* of capital and labour. Instead of labour waiting on capital to be usefully employed, as formerly, we now witness the unusual spectacle of capital very much at the mercy of labour. The independence of the capitalist, in some cases, has already passed over to the worker; while in other cases, the capitalist is almost at his wit's end as to how he shall devise the ways and means of keeping the control of his own business in his own hands. Under the influence of the war, economic forces are operating on a gigantic scale; and the effects are both startling and unexpected. But it should be clearly borne in mind that the present condition of affairs is to a great extent ephemeral.

Present Economic Conditions.

Economic conditions are at present in a state of flux. Everything is conditional or provisional. Yesterday's agreement is obsolete to-day; while stability and permanence are but nominal factors. On the one hand, we have an appreciation of nominal wages and inflated prices; on the other, we have the consequential depreciation of real wages. Values have been transposed. The cost of living has been immensely increased; and all industries alike are affected. Formerly, organized labour promulgated the demand for a minimum wage, as a panacea for all their woes. This, in turn, gave place to the demand for war bonuses. Latterly, the demand is for war bonuses to be merged in wages, and for improvements in other directions; and so on. The weakness of the minimum wage theory, and the reason why war bonuses have failed to give satisfactory results may be gathered from a previous article.* But the Government is almost wholly to blame for the existing state of affairs.

It should not be hastily assumed from the foregoing that there is any war weariness, nor a disinclination yet on the part of the workers to see the war through to a successful conclusion. On the contrary, never did any people exhibit such grim resolve to finish an unpleasant task—in the interests of civilization.

Settled Conditions Required—Particularly in the Gas Industry.

The present fluctuating economic conditions have resulted in a period of general unsettlement; and this has, in some quarters, degenerated into a policy of drift. But whoever may feel disposed to drift, the organized workers certainly have no intention of so doing. Hence, every opportunity of obtaining higher wages and improved working conditions is utilized to the fullest possible extent. One district is played off against another district, just as one union is, on occasion, played off against another. It is not an uncommon occurrence for two applications for increased wages affecting practically the same body of workers to be presented by two different unions; and, lest either of these should, by some inexplicable means miscarry, a third centralized body representing them and other unions, brings forth an additional application.

Just at the moment, labour is the stormy petrel of production; and, inasmuch as the ink is scarcely dry on one settlement before another application is handed in, it is manifest that such disturbing influences must necessarily cause not only inconvenience, but also something akin to exasperation. What is urgently required is a strenuous endeavour to obtain something like settled conditions; and this is particularly true of an industry like the gas industry.

* See "Journal" for Oct. 10, 1916, p. 72.

The Competence of the National Gas Council.

Criticism has been levelled against the National Gas Council for taking a hand in recent negotiations; but it should be borne in mind that an approximation to settled conditions is more likely to be attained through the instrumentality of a representative and centralized body like the National Gas Council than, in these abnormal times, can possibly be hoped for by individual bargaining. The day of the purely sectional dispute is well-nigh over; and if the National Gas Council is not already competent to conduct industrial negotiations concerning the gas industry with a view to the settlement of outstanding points of difference, then the sooner it is made competent, the better will it be for all concerned. The whole history of trade unionism teems with illustrations which offer the most striking condemnation of the sectional, as compared with the national, point of view; and the strategy, tactics, and success of the federation of trades unions are a sufficiently eloquent commentary on the question at issue.

The futility of an individual undertaking on the one hand disputing with the whole of organized labour on the other hand, only needs to be mentioned in order that it may be fully appreciated. Sectional disputes were common in the early days of trades unionism. Formerly, a branch of a trade, perhaps in one particular town, would enter into a dispute, only to find a solid combination of capital arrayed against it; and the weaker went to the wall. It was a repetition of this precise experience that gradually led to the federation and amalgamation of trades and industries. Profiting by their experience, they lifted the sectional dispute on to a national plane, where they could match combination against combination; and thus they secured benefits and advantages which they could not possibly obtain otherwise.

The persistence of each undertaking attempting to deal individually with each application for increases of wages and alterations of working conditions cannot, in the nature of things, produce anything like a settlement worthy the name. There is an unmistakable tendency nowadays in the direction of federation and centralization both as regards employers and employed; and unless the controllers of the gas industry move with the times the industry must, as a consequence, be prepared to suffer. Responsible settlements are required to-day; and the probability is that these may be readily obtained by setting up the requisite machinery, which shall be adequate and sufficiently powerful to cope with the exigencies of any situation that might arise. It is not here suggested that every local dispute should be raised to a status of national importance, only to be negotiated by some representative National Executive. But it is suggested that a representative National Executive should have its "finger on the pulse," so as to be in a state of preparedness should the dispute develop and assume national dimensions. A settlement arrived at between the Federation of Trades Unions and, let us say, the Executive of the National Gas Council (both bodies representative of all elements in the industry) would certainly merit respect; but whether or not a settlement is effected, both bodies should always have an opportunity of meeting in conference on industrial matters of national importance affecting the gas industry before the subject of the dispute is referred to an outside arbitrator. Whatever may be the merits or demerits of this method of procedure, it would at least enable the industry to put forth its best case in a comprehensive manner from its own particular point of view.

In recent years, the men's local representatives have acted on the advice of, and in conjunction with, their National Executive; and this has enabled national pressure to be exerted on local differences. The managers and directors of gas undertakings have been considerably handicapped through not being similarly circumstanced. An application for an increase of wages has generally resulted in an exchange of confidences from neighbouring and similar sized works; but of national guidance and direction there has been none whatever. While the resultant individual bargaining (so far as the undertaking is concerned) has served to some extent in the past—largely because of an unabsorbed surplus of labour—it should be thoroughly realized that the old conditions no longer prevail. Obviously, there is a serious dearth of labour just now; and this, coupled with an abnormal demand, has transferred the balance of advantage from employer to employed. Hence the need of modern methods and new machinery.

The National Gas Council in this matter is certainly working along right lines, although it is somewhat at a disadvantage in having started so late. This, however, is all the more reason why it should be assisted and encouraged to obtain something like settled conditions—as far as these are obtainable during these troublous times.

The Scottish Gas Council and Tar Distillers.—A Special Committee of the Scottish Gas Council has been appointed to meet the tar distillers for the purpose of arranging a satisfactory basis price for tar and ammoniacal liquor. A meeting of the Committee with the distillers was held in Glasgow last Wednesday (ten company representatives being present); and pending further negotiations, the distillers have agreed not to press for contracts being made meantime, and that they will continue to take deliveries of tar and liquor as usual.

RESTRICTIONS IN THE USE OF GAS—AND AN OPPORTUNITY.

By Norton H. Humphrys.

Anything in the way of economy is distasteful to the average Briton, who favours free-handed hospitality (sometimes the same thing as prodigality), to the exclusion of all that is considered to be mean or niggardly. The extent of expenditure is in many quarters the primary consideration, and ranks before character and ability. A well-known feature of the Scottish character is often alluded to with good-natured contempt; and the same has been extended to Continental methods of preparing food. Consequently, the apostles of economy who have been more or less in evidence during the last three years, have found that their efforts were not generally popular, and especially that the connection between economy and patriotism was not recognized or appreciated—at any rate, by those who happen to be in the swim, and in one way and another are profiting largely by the National misfortunes. The difficulty of pressing this fact home has strongly accentuated the need for enforced rations, especially of foods and fuels. When economy becomes a matter of necessity, even to an extent that does not mean privation, it is regarded as a hardship; and many prefer to face the numerous worries involved in living beyond their means, rather than reducing their living expenses to an extent that will be obvious to their neighbours. Frequently, those who stand greatest in need of advice on these lines are the first to resent suggestions as to the avoidance of waste; and as regards household matters, many things are beyond the control of those directly interested—being dominated by so-called "servants," imbued with the views above indicated.

This applies especially to the consumption of coal gas, which in some respects has suffered from being sold too cheaply. Such considerations as efficient service, uniformity of supply pressure, maintenance of appliances in maximum efficiency, &c., have been eclipsed by the possibility of 2d. off the price. One of the lessons taught by electricians is that the public are prepared to pay for good service, and to patronize it to the exclusion of a cheaper article. Many far-seeing gas managers have endeavoured to deal with the subject of waste of gas, but for the most part have piped to deaf ears. The object of providing an assortment of various sizes of burners on the hot plate of a cooking stove has been clearly explained over and over again; but the practice of putting on nearly a gallon of water over the largest, when a quart over a smaller burner would meet the requirement, of placing a 4-in. vessel over a 6-in. ring and letting the bulk of the flame tail-up the sides, of putting a utensil to one side when it boils, instead of reducing the consumption of gas, of using single vessels over two or more burners when a combination of the steamer type might be used, and of carelessness in turning-off flames that are not in use, are not extinct, and are not likely to become so, even under official consumption restrictions.

The original object served by the bye-pass flash light—viz., to economize gas by enabling turning off and on by a single motion, perhaps several times in one evening—has been almost totally eclipsed by the notion that it is simply a convenient igniting device, for dispensing with matches or tapers. In good-class houses the whole of the principal apartments, landings, offices, &c., are fitted with flash lights, some of which are not used for the original purpose once a month, and quite a large proportion of the burners proper do not average two or three hours a week; while the flash light is burning for the remaining 165 or 166. The jet is sometimes much larger than is actually necessary; and it is not too much to say that the gas used for flash-lights exceeds that required for legitimate light and consumption.

In the old times, when the much misrepresented advice of Solomon was literally acted upon, and an occasional thrashing was considered as necessary in regard to character and ability, as a dose of brimstone and treacle in a physical sense, the caning of the whole of the class for a fault of individual character was not unknown. In order to make sure that one guilty member suffered adequate punishment, the whole of the community were equally treated. And restrictions in the way of fixed rates and reduction without discrimination amount to a confession of failure to locate individual culprits, and therefore a determination to use the cane indiscriminately all round, possibly in view of inability to find a more equitable measure. The cases of flagrant waste indicated are not a fair sample of the majority, and, for various obvious reasons, have rapidly diminished within the last few years.

Among the slot-meter consumers, the consumption comes under the direct control of an economical housewife, and waste from any source becomes immediately obvious by the premature demand for another coin in the slot. At the present time, many ordinary consumers, though possibly showing some increased consumption on account of the exorbitant price and the difficulty of obtaining coal, have, either from choice or necessity, considered general household economy to an unprecedented extent; and in other instances there is but a small margin for making the 16 p.ct. restriction by reduction of waste. The result is that while the extravagant user practically escapes scot free—being only compelled to adopt precautions which probably he is only too glad to take up for personal considerations—the careful user is subject to privation, having no margin other than reducing his hours for lighting, cooking, or heating, as the case may be. Domestic users who have acted on the repeated suggestions to grow their own requirements of fruit and vegetables, and to preserve the same for use over twelve months, are in these circumstances practically prohibited from using the gas necessary for the purpose. The manufacturer depending upon gas, and having no margin to work on, is compelled to shut up one day a week—thus restricting production of necessities to an extent that will lead to a substantial increase of already high prices. The fundamental defect of *pro ratâ* restrictions on all alike is that they do not discriminate. In many respects they go further than this by reversing the obvious order of things; and, in aiming a blow at the culprit, miss their object, and spend the whole force on an innocent bystander. In regard to restrictions on the use of gas, happy is the careless and extravagant user who has a margin of 30 to 40 p.ct. to work on.

The sliding-scale, which has been the means of inflicting serious loss and depreciation of property upon a large number of economical and thrifty people, who are, of all classes of the community, the least able to bear such loss, seeing that a large proportion are widows or elderly spinsters, is an example. In theory, it secures an equitable provision of the benefits gained by technical skill and business energy between the shareholders and consumers. But it does not recognize the fact that some reduction in working expenses may be secured by other means, such as lower prices for materials and other items, included in the expenditure side of the revenue account. The converse also holds good. Increased costs may be due to bad management or to uncontrollable causes, as exemplified by the experiences of the last four years. The consumer does not object to accept reductions in the price of gas, without inquiry as to their cause, but is inclined to kick when the reverse takes place, and to urge that the gas company should bear the brunt of the bad, seeing they have benefited by the good—forgetful of the fact that the same argument applies to them also.

The comparison made between various classes of consumers holds good in the case of gas undertakings. A concern that has utilized every available resource in the way of supplying on the most favourable terms, and has accepted a comparatively low initial or standard price, now finds that its obligations do not admit of earning a profit. But where, under a high maximum price, an easy-going policy has been followed, for which the consumers have had to pay, it may still be practicable to pay full dividends. The ideas of the Board of Trade as to the margin allowable for contingencies above current expenses have shown a tendency to decrease almost to vanishing point in the course of years. A company whose latest application to Parliament was in (say) 1880, probably obtained a maximum or initial price that represented an allowance of perhaps 50 p.ct. added to the current working costs, but one whose Act dates thirty years later, probably was granted less than half the contingency margin on a much lower net cost. So the position in regard to war conditions is a matter of "luck" rather than management, with a strong trend in favour of those who have least claim to it. Local circumstances have some influence; but in a general way the necessities for application for increased powers synchronize with the skill and energy applied in the development of business. As with the consumer, happy is the slow and easy-going gas undertaking.

But a unique opportunity now offers for instruction in the economical use of gas. A war expenditure reckoned in millions sterling per day, and the wholesale destruction of our merchant shipping, will bring about conditions that mean rigid economy to a large section of the community. Many far-seeing managers have essayed this task in the past; but their endeavours have been generally received with indifference, if not suspicion. Some consumers have regarded such action as an unwarrantable interference with their private affairs—arguing that, so long as the bill is paid, no second party is concerned. Others have looked on such proceedings as a dodge of the "wolf in sheep's clothing" character, having the increasing of the gas bills as the main object. But now the tide has turned strongly in the direction of appreciating such efforts. Unfortunately, little can be done at the moment in the way of replacing badly designed, wasteful, or worn-out appliances; but ground can be prepared for action in this direction under more favourable circumstances, and the consumer can be taught that working efficiency and durability are more important than bare first costs of an appliance. A fortnightly visit to many meters is a large order on the present depleted staff, already heavily overtaxed by demands for official returns. But the more frequent contact with consumers enhances opportunities for intimate contact with actual gas consuming conditions. In large companies the assistance of the sales department may be utilized, and a competent observant salesman in the course of his meter-reading round may see many things that suggest ear-marking certain consumers as desirable subjects for subsequent special visits. Cards giving instructions how to read the index and compute consumption may be freely distributed where they are likely to be used; and many customers in the act of checking the fortnightly consumption will appreciate the economical aspect of gas for many purposes to a previously unheard-of extent. It is up to the sellers of gas to realize this new position and utilize it to the full.

Protecting Cast Iron from Rust.—A method is described in the "Zeitschrift des Vereines Deutscher Ingenieure" by which cast iron may be protected from rusting by the use of cadmium. Cadmium combined with copper or zinc is particularly suitable for protective coverings on cast iron, wrought iron, and steel. The covering is not melted on, but is formed cold by an electrolytic process.

YORKSHIRE JUNIOR GAS ASSOCIATION.

Visit to a Glover-West Retort Installation at the Bradford Corporation Gas-Works.

On Saturday last the members of the Yorkshire Junior Gas Association visited the Thornton Road Gas-Works of the Bradford Corporation, for the purpose of hearing a paper by Mr. E. Gillett, of Bradford, on "Repairs and 'Maintenance' Costs of a Two Million Cubic Feet per Day Glover-West Vertical Retort Installation."

Mr. E. GARSED (the President) occupied the chair. There was a good attendance; the visitors being received by Mr. Charles Wood, the City Gas Engineer.

Mr. WOOD, after expressing his pleasure at seeing such a large muster, said they had got at their works one of the finest Glover-West vertical retort installations in the country, if not the finest and most satisfactory. If there was an installation anywhere that had done better work than this one, he had yet to see it. Before that day they had not in any way published any figures or results that they had obtained there; and he thought that there were very few people who had really known what they had done with this plant. It had been entirely satisfactory—they had been even more than satisfied with it. As they would all know, the successful working of any plant depended very largely indeed upon those directly in charge of it; and he wanted to say that the success of this plant was very largely due to the attention which Mr. Gillett had given to it from the beginning. Nobody could have worked more assiduously than he had done. He had made it a hobby; and the complete success of the plant had been due to him more than to anybody else. Some of the figures in his paper might be open to criticism; but, taking them altogether, they would find the results were somewhat remarkable. They must consider the very inferior quality of the coal which had to be used. In many plants, where perhaps better results had been obtained, there had been picked nuts and specially selected coal. Here it had been a question, for the last three years especially, of using just what they could get. They had never had an official opening of the works or a test run, for the reason that ever since they had got properly to work the results had even exceeded the guarantees of Messrs. West. He hoped they would all find something to learn there. If, on the other hand, the visitors could give any tips as to getting better results or improving the working in any way, he would be very much obliged to them.

The members then visited the installation referred to, under the guidance of Mr. Gillett, Mr. James Roper, and Mr. Settle; its features being discussed in detail in a conversational way.

REPAIRS AND MAINTENANCE COSTS OF A TWO MILLION CUBIC FEET PER DAY GLOVER-WEST VERTICAL RETORT INSTALLATION.

Mr. GILLETT then read his paper, which, together with a report of the discussion to which it gave rise, is here reproduced.

I am placing before you a short account of the cost for repairs and maintenance of a 2-million cubic feet per day Glover-West vertical retort plant.

The plant is built in two separate one million units, each having its own condensing, washing, and purifying apparatus, &c. The first half of the plant (No. 2 House) was put into operation on July 4, 1912, and the second half (No. 1 House) on Nov. 21, 1912. The retorts, 32 in each unit, were worked continuously up to the spring of 1915, when each setting was put down for repairs. The total days worked—which in this case means actual gas making days, and does not include time spent in drying and heating-up the settings—are set out below.

No. 1 House (32 *Retorts*).		*No. 2 House* (32 *Retorts*).	
No. 1 Bed	860 days	No. 1 Bed	1132 days
2 ,,	854 ,,	2 ,,	1132 ,,
3 ,,	854 ,,	3 ,,	1129 ,,
4 ,,	855 ,,	4 ,,	1127 ,,
Average	856 days	Average	1130 days

The retorts were freed from scurf before cooling, and were then allowed to cool-down very gently. When cold, the coal valves, coal boxes, and gas off-take pipes were removed and overhauled; and the bottom mouthpieces and worm castings were then taken down, cleaned, and repaired. The top halves of the worms were all renewed; and one bent shaft was replaced. All the shafts, with this exception, and the bottom halves of the worms, were in a very good and straight condition, and were put back again. Each retort was then carefully inspected from top to bottom, and any bad places found were marked off for cutting out. Warped joints were hemmed down and refaced, &c. The bricksetters then repaired the small defective parts in the retorts with Derbyshire silica bricks, using "Korktite" cement mixed with silica clay (half and half). Caulkers followed, and caulked each joint and crack with putty made of "Korktite" cement, being sure that the stuff was well hammered and pressed home. The inside faces of the retorts were finally washed down with thick cement wash. The retorts in No. 1 house were treated in the same way; the actual cost being as follows.

	No. 1 House (32 *Retorts*). Repaired 1915.		*No. 2 House* (32 *Retorts*). Repaired 1915.
Four Producers—			
Bricks (1081)	£3 5 0	(1218)	£3 13 0
Clay	0 18 0		0 18 0
Labour	8 10 3		7 2 11
Retort Repairs—			
Bricks (1119)	3 17 6	(2350)	9 15 0
Cement and clay	5 5 0		7 7 0
Labour, bricksetters	21 19 7		44 13 10½
,, caulking	34 8 3		29 2 9
Ironwork—			
New top half worms	86 0 0		86 0 0
Cement bolts, &c.	8 0 0		5 0 0
Taking down, repairing, and replacing castings, coal valves, &c.	124 17 0		124 17 0
	£294 0 7		£318 9 6½

The weight of coal used and volume of gas produced during the period stated is given below; the time for scurfing, stoppages, slackening of throughput, &c., not being taken into account.

	No. 1 House (32 *Retorts*). 1912–1915.	*No. 2 House* (32 *Retorts*). 1912–1915.
Coal carbonized, tons	60,959	81,194
Do. per day, tons	71·21	71·85
Gas made, c.ft.	818,839,000	1,077,778,000
Do. per ton of coal, c.ft.	13,432	13,274
Do. per day, c.ft.	956,000	954,000
Average days worked	856	1,130

The worm tops in No. 1 house were renewed, although they were in a fairly good working condition—it being thought best to prepare for another long run. This section is now undergoing repairs after having completed a further 949 working days, and is open for inspection. The No. 2 house retorts were put to work after repair, and were again set down in the summer 1917, and worked as follows:

No. 2 House (32 *Retorts*).
1915–1917.

No. 1 bed	567 days
No. 2 ,,	570 ,,
No. 3 ,,	548 ,,
No. 4 ,,	541 ,,
Average	556·5 days

The repairs were somewhat heavier than before, owing to the moving parts at the bottom of the retorts having to be removed, some renewed, and the rest repaired. The whole of the worm shafts were renewed; but the major portion of those taken out were straightened and returned to store for further service. The repairs to the retorts were somewhat heavier; and an extra item was the replacing of eight regenerator castings at the bottom. The costs of materials and labour were very much higher than in 1915. The actual cost, at 1917 prices, was as follows:

No. 2 House (32 *Retorts*). *Repairing*, 1917.

Four producers—	
Bricks and clay (1337)	£6 15 0
Bars, drip plates, and lintels	16 13 6
Labour	13 4 11½
Retort repairs—	
Bricks (5363)	32 5 0
Cement "Korktite"	18 0 0
Labour, bricksetters	161 12 2½
,, caulking	59 5 11
Regenerator repairs—	
Bricks	12 10 0
"Korktite" and clay	19 1 9
Labour	48 18 7
Iron work—	
New worms	135 4 6
Repairs and renewal of shafts	67 4 9
Bolts, cement, &c.	12 8 5½
Taking down, repairs, and replacing castings	225 5 4½
	£828 10 0

Since starting in 1912, the total cost in repairs for our No. 2 house works out as follows:

1915 Repairs (1130 days)	£318 9 6½
1917 ,, (536 days)	828 10 0
Maintenance cost during working period	149 13 1½
Total cost for repairs, 1686 days worked	£1296 12 8

Coal carbonized in this period, 122,700 tons

The cost of repairs for No. 2 house is therefore 2·54d. per ton for 1686 days. The whole of the retorts worked smoothly and regularly, and have given very little trouble in the hanging-up of charges of coal. The coal and gas returns for both settings up to March 31, 1918, are as follows:

	No. 1 House (32 *Retorts*). 1915-1918. Stop.	*No. 2 House* (32 *Retorts*). 1915-1917.	1917-March, 1918.
Coal used, tons	62,374	41,506	18,080
Coal per day, tons	65·7	74·5	69·0
Gas made, c.ft.	915,558,000	614,974,000	271,757,000
Gas made per ton of coal, c.ft.	14,678	14,816	15,030
Gas made, per day, c.ft.	965,000	1,105,000	1,037,000
Average days worked	949	556·5	262 { Still working

We have no special or selected supplies of coal; we carbonize slack, washed and unwashed nuts, and unscreened coal—all being Yorkshire coals. The coal is tipped into a 10-ton hopper, and no mixing or grading takes place. Any variation in coal or working soon shows itself, and is readily adjusted. Steam has been used for the last five years, with the object of increasing the make and reducing scurf; and it has been found to reduce the dust nuisance when discharging. Steaming has had no bad effect on the retorts—in fact, the bottom sections are in a much better condition than the top sections. The greatest wear and tear in the retorts takes place between the 4 ft. and 9 ft. levels from the top. The faces of the retorts were roughest in this short length, which may have to some extent been caused by rodding, scurfing, or else chemical action. One retort only exhibited pronounced warping in it, extending a distance of 9 ft.; and this was cut out and rebuilt with silica bricks. We had slight trouble with short-circuiting between the fire-clay section of the retorts and the iron regenerator castings. This eventually fused holes in the iron castings, which we have had to replace with new ones. We overcame this by putting out the retort a little and pressing in 1-in. silica pieces well buttered with Korktite all round the joints. We had in four cases to cut out the second section from the top to get at places where we had noticed short-circuiting between the top heating section and the first circulating section. The silica work put in in 1915 has stood very well, and does not show the same wear as the fire-clay retort section.

The calorific value of the gas made over the whole period of time averaged 540 B.Th.U. gross.

The half-yearly returns up to December, 1917, are as follows:

Half Year Ended . .	1912. Dec.	1913. June.	1913. Dec.	1914. June.	1914. Dec.
1. Coal and cannel carbonized, tons	16,149	26,448	26,374	25,614	25,446
2. Cannel carbonized, per cent.	..	..	..	..	..
3. Gas made, thousands . .	194,736	322,695	344,754	344,321	364,088
4. Gas made per ton of coal, cubic feet	12,058	12,201	13,071	13,442	14,308
5. Coke and breeze saleable, tons	8,361	14,710	14,587	13,830	13,498
6. Coke and breeze per ton of coal, cwt.	10·3	11·1	11·5	10·8	10·6
7. Tar made, tons. . . .	931	1,535	1,779	1,623	1,660
8. Tar made per ton of coal, gallons	11·2	11·3	13·1	12·3	12·3
9. Liquor made, 5° T., tons	2,106	3,213	3,525	3,164	2,814
10. Liquor made per ton of coal, gallons. . . .	28·5	26·5	29·2	27·0	24 2

Half Year Ended—	1915. June.	1915. Dec.	1916. June.	1916. Dec.	1917. June.	1917. Dec.
1	19,538	21,149	26,408	25,009	16,789	24,702
2	1·53	8·07	..	..	0·24	..
3	278,677	306,519	382,297	366,202	268,858	361,852
4	14,263	14,433	14,476	14,642	16,014	14,648
5	9,352	10,689	13,521	11,566	7,820	12,154
6	9·5	10·1	10·2	9·2	9·2	9·8
7	1,321	1,364	1,626	1,471	904	1,572
8	13·2	12·5	12·0	11·5	10·5	12·4
9	2,573	2,695	3,578	3,171	2,789	3,089
10	28·8	27 8	29·6	27·7	36·2	27·3

DISCUSSION.

In the discussion which ensued,

Mr. CHARLES ROPER asked if there was any special reason for the liquor figure of the June, 1917, half year, which was a figure outstanding from the others.

Mr. P. M'NAB said that Mr. Gillett's paper made out a very good case for vertical retorts and steaming. He had been wondering why the No. 2 house appeared to have given as good results as the No. 1 house at a cost of 1s. 3d. per day less. After working 274 days longer, it would have been only expected to find No. 2 house in worse condition than No. 1, and thus to have cost more in repairs.

Mr. GILLETT said, in reply to Mr. Roper, that they were in a very peculiar position at the works with regard to tar and liquor. The tar was light, and mixed badly with the liquor. Taking the two together, there was not much difference between one quarter and another. In the period when they were getting rather more per ton of coal, they were trying things and steaming more heavily. This might have something to do with the difference.

The PRESIDENT said it would be interesting to know the calorific value of these periods.

Mr. GILLETT said they never got below 460 net—that was, over 500 gross. The reason why the No. 2 house gave as good results as No. 1, and at less cost, added Mr. Gillett in reply to Mr. M'Nab's question, was that when they came to deal with No. 2 house they had the benefit of the experience which they had gained in dealing with No. 1 house, which they had experimented with firstly. Replying to questions by another member, he said the figures of coke represented actual sales over the scales, and did not take account of anything that went into the boilers.

The PRESIDENT having asked if Mr. Gillett could give the percentage of breeze, the author replied that it varied greatly according to the quality of the coal that they got.

In answer to an inquiry as to the frequency of scurfing, Mr. GILLETT said they used to scurf every five weeks, but now they did it every three months whether it was necessary or not.

The PRESIDENT said he would like to know whether the figures of yield of liquor and tar relatively for the June, 1917, half year had any direct bearing on the question of the steaming, and also how the steaming had been carried out—whether it had been superheated steam and how it had been applied. Did Mr. Gillett think that the excessive steaming was the reason why the coke and breeze yield, after starting in 1912 at about 10·3 cwt. per ton of coal, had fallen to 9·2 cwt.? Could the author explain why he had been able to prolong the scurfing period from five weeks to three months?

Mr. GILLETT said there was no avoiding having less coke to sell if they were making more gas per ton of coal, as the figures showed that they were doing. Moreover, the reduced figure of coke for sale was in part accounted for by the increasing inferiority of the coal. They had to put more through the producers to get the required temperature. With regard to the prolongation of the period of scurfing, the steam kept down the quantity of scurf and prevented its formation. It had a sort of cushion action. They found that about 12 ft. was the furthest point that they got with scurf. It was all within easy reach of a medium length iron from the top. They never had to go to the bottom now as they used to have to do at first. The steam was put in in the original place as designed by West's—through a ¼-in. hole underneath the worm. The steam was wet when it went in; and they thought that it superheated itself in traversing the regenerator part of the retort, where it had to pass through or round the hot coke. He thought it did not pass through the coke, but simply played all round the outside. The quality was kept up by the coke being replaced with fresh material continuously, and a steady supply of steam being maintained. They had a preseure of about 40 lbs. at the boiler and of 28 lbs. at the back of the nipple. As to the tar and liquor figures, there were no separate settling tanks, and these were combined. The tar which was made now was much lighter and thinner than it used to be. It was about 10 8. There was certainly more of it; and they did not get as much pitchy stuff in the collecting mains as formerly.

The PRESIDENT said he was inclined to think that if poking—which it seemed to have been the general practice to reduce to hourly periods—could be brought to half-hourly periods, it would have the effect of lengthening to a considerable extent the times of working. The formation of scurf was mainly due to accumulation of pressure at the highest temperature; and it was the poking which would best relieve this.

Mr. GILLETT said that the difficulty was that of probable trouble with the men if they asked for half-hourly poking. They needed, of course, to keep a good steady pressure in the retort, and keep it at a decent colour. The moment they voided the gas, they had everything that was bad coming upon them. When such things as these were being offered, the story was, "No dust, no dirt, no steam, no anything." But after they had got them, they woke up. In his experience, he found that the men had gone to the retorts and pricked them over more often than they had been asked to do, because they found they had less arduous labour if they did so. But he would be glad if they went and did the pricking twice as often as they did, because the quality of the gas could be so much altered by the frequent use of the rod. At the same time, it was easy to blame a man for bad pricking when in fact the results were due to the coarse stuff they were now getting in the way of coal.

VOTE OF THANKS.

The PRESIDENT, in proposing a vote of thanks to Mr. Gillett, said he had learned a good deal that afternoon, and probably much that justified what he had said in his address in February, and led him to think that what was said about him at that time was somewhat out of place. Mr. Gillett had practically convinced them that, though hanging-up was not very often taking place, he could not say it did not occur. This was his (Mr. Garsed's) point in Feburuary; and he raised it in order to get information as to how hanging-up might be reduced. Mr. West appeared to think that he (Mr. Garsed) did not know what he was talking about; and, on the advice of his friends, he did not then make any definite reply. He was more obliged to Mr. Gillett, however, for the open way in which he had stated to them his troubles with vertical retorts than to Mr. West for his uncalled-for reference to what he had said last February. When he was in conversation with Mr. Gillett two or three years ago, that gentleman told him that most of the troubles arose through neglect. He agreed with Mr. Gillett then, and also agreed with most of what he had said to them that day. They should remember, however, that the factors of misattention and neglect varied very considerably. Such troubles might be not so considerable in cases of large units, which had somebody on the job to see that proper things were done day and night; but troubles were intensified when they came down to small units which were not favoured with twenty-four hours' expenditure on supervision. This was a point that he had been driving at in his February address.

Mr. J. W. ROPER seconded the vote of thanks, which was carried.

Mr. GILLETT said that any time any of them cared to see the plant they would be entirely welcome. He had been very fortunate, in working it, in having had a free hand, and had been greatly helped by all who had worked with him in respect to it.

The proceedings then closed.

Sulphate of Ammonia after the War.—Writing in "Nature," Prof. Thorpe says: There is one outlet for sulphuric acid which is capable of far greater development; and that is in the manufacture of fertilizers, and especially of superphosphates. There can be no doubt that the food shortage in the country, due to our enemy's activities, has had a profound effect on our agricultural policy, and will lead to a permanent increase in home production. This will, of course, necessitate a greatly increased demand for fertilizers, such as sulphate of ammonia, as well as of phosphatic manures. Much ammonia is at present absorbed in the production of nitrate of ammonia, which is needed in the manufacture of munitions. But this ammonia will be liberated after the war, and will be largely converted into sulphate for agricultural use.

GAS AS A FACTOR IN RECONSTRUCTION.

There is included in the April issue of the "Journal of the Institution of Sanitary Engineers" a lengthy paper by Major A. J. Martin, M.Inst.C.E., on "Gas as a Factor in Reconstruction after the War." Twelve years ago, the author read two papers—before the Royal Society of Arts and the British Association—calling attention to the waste going on in the consumption of coal; and he now puts forward anew the suggestions he then launched.

Considering the need for economy in the use of coal, Major Martin remarks that the *crux* of the problem lies in the fact that in every coal-consuming process, however economically conducted, a very large proportion of the heat is wasted. This waste is unavoidable, and cannot be prevented by any possible improvement in industrial processes; but it can be very greatly reduced by grouping a number of operations together in such a way that the waste heat from one of them is used in the next. Working on these lines, he proposed to utilize the whole of the coke-oven gas and to generate additional gas from the small coal at the pit's mouth—piping the gas to the works throughout the country, and using the waste heat to raise steam for compressing the gas and generating water gas. On the financial side, it is claimed that gas of a high calorific value could be generated in the coalfields and delivered in London at a cost which would admit of its being sold at something like one-half the present price. When the proposals were originally made, fears were entertained that, with gas at the pressure contemplated, transmitted over long distances, leakage would constitute a serious difficulty; and on this question, reference is made to reassuring experience at Aurora (Ill.), as well as to the security afforded by the weldless steel tubes now on the market. It was also asserted that under high pressure, a very large proportion of the volatile and other constituents would be thrown down in the form of liquid, and that chemical difficulties of an insuperable nature would arise. But, says the author, in his present paper, the value of gas no longer depends to any serious extent on the constituents which might be removed by condensation. Further, the fears which had been expressed as to the effects of condensation have not been borne out in practice—as shown by the report of the Executive Committee of the British Commercial Gas Association, issued last year, on "Coal Gas for Motor Traction." This dealt with experiments made to determine the effects of compression on coal gas, and stated that the deposition of the water-contents of the gas consequent on compression would practically compensate for the loss of calorific value due to the deposit of hydrocarbons at 20 to 25 atmospheres compression. In recent observations, with a pressure of 200 lbs., it was found that the effect of compression was even less; the loss of heat value being under 1 p.ct., and more than compensated for by the almost complete dehydration of the gas. Besides the water vapour, other impurities, Major Martin suggests, would also probably be thrown down—the purification thus effected being sufficient for many, if not all, of the purposes for which the gas would be used.

Reference is made in the paper to the reports of the Coal Conservation Sub-Committee and the Fuel Research Board, on the questions of the need for conserving coal and the extended use of gaseous fuel; and the author concludes his paper by quoting some of the advantages which he believes would result from the adoption of a comprehensive and well-devised scheme for the generation of energy at the pit's mouth and its transmission to the consumer—with the establishment of chemical works near collieries to deal with the bye-products. These advantages include an important saving in the consumption of coal and in its transport; a cheap and abundant supply of energy; a supply of fuel oil for the Navy, and of compressed gas for motor vehicles; and the establishment of important chemical industries to deal with the tar and other bye-products. His plea is that, "in mobilizing our resources for the coming industrial conflict, a medium presenting such tremendous possibilities as gas ought not to be shouldered aside unheeded."

THE SYNTHESIS OF AMMONIA.

In a recent issue of the "Journal of the Chemical Society" some interesting data on this subject are furnished by Dr. E. B. Maxted, of Walsall.

It is pointed out that whereas at moderate temperatures, such as are employed for the catalytic synthesis of ammonia, an increase in temperature leads to a rapid decrease in the amount of ammonia in equilibrium with nitrogen and hydrogen, this amount passes at higher temperatures through a minimum, and, with increasing temperature, begins to rise with increasing velocity. Haber has worked out a formula by which the ammonia equilibrium may be calculated for any temperature below 1000° C., but actually, more ammonia is obtained at (say) the temperature of the oxy-hydrogen flame than is given by the formula.

It was therefore assumed that mixtures of nitrogen and hydrogen at high temperatures contain ammonia which, by rapid cooling, might be brought without complete decomposition through the temperature zone at which ammonia becomes unstable into that region of temperature in which it is once more capable of stable existence. This was proved by injecting the mixture of nitrogen and hydrogen into an oxy-hydrogen flame burning either under water or in a water-cooled silica tube. The silica reaction chamber consisted of a tube 6½ mm. diameter and 75 mm. long, completely immersed in distilled water. Into this chamber, nitrogen, hydrogen, and oxygen were injected and ignited; the flame gases passing out of the open end of the reaction chamber and bubbling through the water, by the action of which the ammonia recovered from the flame by sudden cooling was retained. In some cases the water was replaced by dilute acid, but without any appreciable difference in the results.

The amount of oxygen passed into the reaction chamber was in every case regulated so as to leave uncombined hydrogen equal to three times the volume of the nitrogen passed in. The following table shows some of the results obtained by direct cooling with water or acid:

Litres of Gas per Hour Passed into Reaction Chamber.			Duration of Experiment. Minutes.	Cooling Agent.	Estimated Temperature of Flame. ° C. Absolute.	Percentage Volume of Ammonia formed at 1 Atmosphere Pressure.
Nitrogen.	Hydrogen.	Oxygen.				
60	220	20	15	Acid.	1280	0·0027
60	260	40	15	Water.	1500	0·0067
60	360	90	15	Water.	1830	0·0230
30	270	90	15	Water.	2120	0·0450
20	240	90	15	Water.	2260	0·0660
20	300	120	10	Acid.	2350	0·1460
20	460	200	5	Acid.	2470	0·4200
10	430	200	5	Acid.	2580	1·2300

In other tests, the reaction chamber consisted of a silica tube forming the inner tube of a vertical Liebig condenser. The flame gases, which in this case were cooled only by contact with the cold walls of the silica tube, were allowed to pass from the bottom of the tube through N/10 acid, which was afterwards titrated as usual. As was to be expected from the less rapid cooling, the amount of ammonia produced at high temperatures was less than that obtained by directly leading the flame into cold water; the maximum, at 2580° C. absolute, being 0·21 p.ct. of ammonia only, against the 1·23 p.ct. by direct cooling.

SPONTANEOUS COMBUSTION IN COAL-PILES.

A general statement issued by the United States Bureau of Mines advises that coal should be stored in small lots, close to the place of consumption, to avoid rehandling and second transportation. Piling warm coal on a hot day, extraneous sources of heat, and alternate wetting and drying, should be avoided; and methods of handling should be such as reduce to a minimum breakage and the formation of fresh surfaces. The least friable kinds are preferable; and if dust and small are removed and used as soon as possible, leaving only lump in the stack, trouble is prevented that otherwise might occur. The lowest possible sulphur content is preferable; and two or more brands should not be mixed in one heap. The floor should be dry, and the lumps even-sized, without irregular mixture of coarse and fine.

Air should circulate freely throughout the whole (which is a natural condition when the pile consists exclusively of coarse lumps), and the surface exposed so arranged as to facilitate quick cooling. Or such circulation may be practically prevented, with the exception of small surface contact, as in an air-tight bin without side or bottom openings. In this case, the bulk is soon enclosed in inert nitrogen. High piles lead to increased liability to heating, especially with soft coals, by crushing at the base, and also by increasing the proportion between bulk and exposed surface. About 12 ft. is a very general limit. To keep in touch with rise of temperature, ½-in. iron pipe should be driven vertically, at intervals of 15 to 20 ft., to the base, and tests with a maximum thermometer taken twice a week for the first three months. They may be less frequent if the coal ceases to give signs of activity.

Any portion showing over 150° Fahr. should be rapidly rehandled, as at this temperature oxidation is likely to be dangerously rapid; and any method that does not ensure efficient cooling is simply shifting trouble from one place to another. Extensive heaps should be subdivided in such manner as to confine rise of temperature to one section, and avoid spread to parts that otherwise would remain cool. As a general rule, water is useless for cooling. The more frequent causes of serious loss by spontaneous combustion are lack of facilities for rapid cutting out of affected parts, cooling, and re-piling.

Laying Gas-Mains under the Sea.—From an account appearing in the "Elektrotechnik und Maschinenbau," it appears that Kristiansund (Norway) has been recently equipped with gas-mains. The town is spread over four islands, separated by deep sea. The mains consisted of steel Mannesmann tubes screwed together by connectors. The operation of connecting was carried out by divers, who joined-up to the sections previously laid long sections that had already been screwed together on land and subjected to a pressure test. As portions of the gas-mains lying at great depths constitute traps for water, it is necessary to ensure that the gas to be carried is completely freed from moisture. This is attained by causing the gas to pass through tubes surrounded by cooled air, and collecting in special receivers the water that is deposited.

DETERMINATION OF MOISTURE IN COKE.

The United States Bureau of Mines have published—Technical Paper No. 148—an account by Messrs. A. C. Fieldner and W. A. Selvig of some experiments undertaken for the purpose of ascertaining the most rapid and simple method for determining the moisture in coke with sufficient accuracy for use in specifications for the purchase of coke by the Government, by industrial concerns, or by private individuals.

For the determination of moisture in coal, the Committee on Coal Analysis of the American Society for Testing Materials and the American Chemical Society recommend heating the pulverized sample (60-mesh) for one hour at 104° to 110° C. in an oven through which is passed a rapid current of air dried by transit through concentrated sulphuric acid. Under the same conditions, 20-mesh samples must be heated 1½ hours. In order to obtain comparable results, the method specified must be strictly followed —especially with coals normally having a high moisture-content. Experiments have shown that such coals will easily give off 1 p.ct. more moisture in an atmosphere of circulating dry air than in an atmosphere of more or less stagnant air, in which there is an appreciable partial pressure of water vapour. It is also essential, in order to obtain the correct moisture-content, to pulverize the coal to a fineness of at least 10-mesh before the final moisture determination. The best practice is to air-dry the coal at ½ in. or ¼ in. size, and then to pulverize it for the final determination of residual moisture, thus determining the water in two stages. Undoubtedly, the above method for the determination of moisture in coal gives results of the same degree of accuracy when applied to coke. However, owing to the much greater stability of coke compared with coal, it is believed that a simpler method gives accurate results. It seems probable that the circulation of dried air is unnecessary; that larger temperature limits than 104° to 110° C. are permissible; that no appreciable gain in weight due to absorption of oxygen takes place on heating longer than one hour; and, finally, that practically all the moisture should be removed on heating the unpulverized coke to constant weight. If the latter procedure is permissible, the ever-present danger of loss of moisture during pulverization will be eliminated, and it will be possible to determine the moisture-content of a shipment of coke with the same ease and simplicity as for iron ores.

The first series of tests were made to ascertain whether the circulation of dry air through the oven is necessary to remove the maximum amount of moisture. Twelve samples of different metallurgical cokes from various sources were prepared by crushing the air-dry coke to 60-mesh. Moisture determinations were made in duplicate by the standard method used by the Bureau of Mines for determining moisture in coal. Samples weighing 1 gram were placed in ⅞-in. by 1¾-in. porcelain capsules, and in sets of twelve heated for one hour at 105° C. in a constant-temperature oven. A current of air, dried by concentrated sulphuric acid, was passed through the oven, and over the samples, rapidly enough to change the total volume of air in the oven two to four times in one minute. At the end of the heating period, the capsules were covered with closely-fitting, flat, aluminium covers, and cooled in separate desiccators over concentrated sulphuric acid. Each capsule was rapidly weighed immediately upon removal from the desiccator. Duplicate determinations were also made in sets of twelve in the same oven, without using dry-air circulation; and a fifth set of determinations was made, in which the period of heating was extended to two hours, in order to ascertain whether any gain in weight through absorption of oxygen took place. Coal samples heated for two hours usually show less loss in weight than samples heated for one hour. No appreciable difference in moisture was obtained by circulating dry air through the oven. The difference for the twelve samples was only 0·005 p.ct. Neither was there any appreciable change in weight on heating the samples for two hours.

The second series of tests were made to ascertain the effect of heating the 60-mesh coke at temperatures higher than 105° C. Three sets of determinations were made—namely, by the standard method at 105° C., as in the first series; by heating in stagnant air at 150° C.; and by heating in stagnant air at 200° C. Each set was heated for a period of one hour, then cooled over concentrated sulphuric acid, and weighed; then it was returned to the oven, heated for an additional 30 minutes, and again weighed.

For each of the three temperatures—105°, 150°, and 200° C.—the loss in weight for one hour was practically the same as that attained through additional heating for 30 minutes. There was, however, a slightly greater loss at the higher temperatures. The greatest difference between 105° and 150° C. was 0·20 p.ct.; and between 105° and 200° C., 0·31 p.ct. The average differences were 0·11 and 0·20 p.ct. repectively. It is probable that the greater loss at the higher temperatures is due to the removal of residual traces of water and gases condensed in extremely thin films on the surfaces of the coke particles. The differences that were obtained on heating the coke powder between limits of 105° and 150° C. may be regarded as negligible. Even the maximum difference of 0·31 p.ct. at 200° C. is within the unavoidable moisture variations likely to be incurred in preparing the gross sample for analysis.

Experiments were then made on the direct determination of moisture in 1-in. lumps, and also in 4-mesh coke, at various temperatures. A large sample of coke was taken from a pile that was wet from a recent rain, and was crushed to 4-mesh size. This sample was then thoroughly mixed and divided into three representative portions, which were treated as described by the authors. The result showed that moisture can be determined in 4-mesh coke by drying to constant weight at temperatures between 105° and 150° C., with practically the same degree of accuracy as in the longer process of first air-drying at 4-mesh size, and then pulverizing the coke to 60-mesh for the final drying at 105° C. in circulating dry air.

The next step in the simplification of the method of determining moisture in coke was to ascertain whether it would be permissible to dry comparatively large samples (10 lbs. or more) of 1 or 2 in. lumps to constant weight on an ordinary hot-plate, coil of steam-pipes, or similar device, such as would be readily available at the point of sampling a shipment of coke. If such a procedure were possible, the total moisture could be determined on the spot. The sample for chemical analysis could then be pulverized to 4-mesh size and quartered down to a 5-lb. sample for shipment to the laboratory, without special precautions for avoiding the almost inevitable loss of moisture.

A sample of approximately 50 lbs. of lump coke was crushed to pass a 1-inch mesh sieve, and thoroughly sprayed with water. It was then mixed for some time, and allowed to stand several hours. The moist coke was placed on a sampling cloth, again mixed, coned, and divided into four parts. Each quarter was placed in a tarred galvanized-iron pan, and immediately weighed. The coke was spread to a depth of about 2 in. One sample was placed in an air-drying oven, and dried to constant weight at 30° to 35° C.; then pulverized and reduced to a 60-mesh laboratory sample, as in the usual standard method. The other three samples were dried to constant weight on ordinary gas-heated hot-plates, at temperatures of 120°, 150°, and 200° C., respectively. There was an air space of ¼ in. between the bottom of the pans and the hot-plate. The temperatures were determined by inserting thermometers in the bed of coke near the bottom of the pans. The sample dried at 120° C. and the one dried at 200° C. yielded 5·9 p.ct. moisture. These results were 0·2 p.ct. higher than that obtained with the sample which was air-dried before the moisture was determined by the standard method. The small differences in results with the various portions were probably due to unequal wetting, rather than to the temperature of drying. Even the maximum difference is quite within the sampling error.

Investigation shows that the influence of temperature, time, humidity of drying atmosphere, and fineness of sample, on the determination of moisture in coke, may be varied over a considerable range without appreciably affecting the result. Oven temperatures ranging from 105° to 200° C. produced a maximum variation in moisture of not exceeding 0·3 p.ct. Coke can be dried to "constant weight" without any gain in weight taking place. The circulation of air dried by sulphuric acid, through the oven atmosphere, as specified for coal analysis, is unnecessary; there being no measurable difference of results between circulating perfectly dry air through the oven and using in the oven the natural circulation of air from the room. Moisture can be determined quickly, and with adequate accuracy (± 0·5 p.ct.) by simply heating to constant weight a large sample of lump coke, in any convenient oven, or on a stove, hot-plate, or steam-coil, at a temperature of 100° to 200° C.

Bottling Fruit and Vegetables.

Practical information on the subject of fruit and vegetable bottling will be more than ever desired during the coming season; and the British Commercial Gas Association have taken steps to meet the want. The April issue of "A Thousand-and-One Uses for Gas" consists of an illustrated article in which three methods are briefly, but clearly, described for the bottling of fruit and vegetables. The operation is one which can easily be carried out, though great care must be taken to closely follow the simple instructions given. Fruit and vegetables treated in the manner indicated remain in perfect condition, and will thus provide the housewife with supplies right through the winter season, when variety under other circumstances is so difficult to secure. Besides this, with the food stringency now (and likely to continue) in evidence, there is additional reason for saving all that is not required during the short spell of abundance. One of the secrets of the process is regular and exact heating; and it is here, of course, that gas is so far in advance of the ordinary coal-fire. Now should be the time to lay in a store of bottles. Many people who have in past years practised the art of bottling will be intetested in the instructions for preserving stone fruit—and plums for three or four years—with sulphur.

Three of the Principal Sulphate of Ammonia Producers.—Recently published statistics show that a production of 700,000 tons of sulphate of ammonia was expected in Germany for 1917; while, according to the most recent available data, the quantity for 1915 was 549,000 tons. For 1917 the American production of ammonia (reckoned in sulphate) is estimated at 400,000 tons; and the capacity for production in 1918 may reach at least 500,000 tons. The Japanese production of sulphate of ammonia is also continuously increasing. While in 1914 it scarcely exceeded 16,000 tons, it reached 31,824 in 1915; and in 1916 the total became 38,203 tons. For 1917 the estimate is 50,800 tons.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Coal and Gas Rationing.

Sir,—Gas consumers (especially those who have practised economy during the last two years) are greatly perturbed in order to keep within the present gas rations. They are in many instances consuming coal instead of gas, to get over the difficulty. According to recent Press announcements, it seems likely that the present household coal ration will be reduced by 33 p.ct. Even this reduction will still give good scope for economizing coal consumption in households, if the Coal Mines department is willing to adopt the following suggestion: For every ton of coal allowed, but not consumed, 5000 c.ft. of additional gas will be allowed per annum on the present gas ration.

At a gas-works, every ton of coal saved by householders can be converted into at least 10,000 c.ft. of gas, and, in addition, provide fuel oil for the navy, benzol and toluol for explosives, sulphate of ammonia as a powerful chemical manure for food production, as well as a very large number of other vital products for the successful prosecution of the war. The finest use which can be made of coal is to distil it.

If the suggestion is carried into effect, it means that, for every ton of coal the householder saves, only about half-a-ton of coal would have to be mined, transported, and dealt with at gas-works, and allow the gas consumer 5000 c.ft. per annum in addition to the present ration. Moreover, from the figures I have before me, the extra allowance in gas would still show a considerable saving in the annual consumption of gas by householders.

H. O. Carr.

Wandsworth, April 27, 1918.

The Production of Fuel Oils.

Sir,—The costs per 1000 c.ft. for materials and labour deduced from the tables accompanying the discussion on fuel oils in the last issue of the "Journal" appear to be 2·48d., 3·00d., and 4·36d. respectively.

It is difficult to understand how these costs can be expanded so as to make the gas produced worth 1s. 6d. per 1000 c.ft.

A. Edwards.

Taunton Gas-Works, April 24, 1918.

Coal Economy.

Sir,—For many years a few of us, here and there, who wished to help towards the abatement of the smoke nuisance in our large cities, have been doing our best to reduce the consumption of coal for domestic purposes by using coke and gas to the fullest extent possible under the conditions existing. The war has brought this (like many other questions) more to the front; and, under pressure of circumstances, the country has now seriously to consider the waste that is going on in the extravagant use of coal, and the unnecessary burning of the valuable bye-products of coal in the British domestic fire-place, as well as the substitution of coke or gas for industrial uses. We have at last got so far as to recognize the difference between one class of coal and another, and are beginning to realize that it is a national loss to burn a rich coal containing valuable bye-products when a leaner coal would suit equally well, if not better. We are actually face to face with coal rationing; and this at once suggests that with the control of the sources of supply to each individual in the hands of the Ministry, something might be done to reduce the losses in question.

On the Continent, and also in the United States and in Canada, anthracite (smokeless) coal or coke is the solid fuel commonly used for domestic purposes—supplemented here and there by small briquettes. It is encouraging to see that, under the coal-rationing scheme which is coming, the use of coke instead of coal is also to be encouraged here. Is it too much to hope, with the present serious talk of reconstruction and economy in all directions, that some further pressure may be brought to bear on consumers, with a view to reduce the consumption of the richer coals for domestic purposes, followed by a classification of coals for industrial purposes?

At the present time the gas companies are generally complaining that they can only obtain inferior coal; while, as is well known, some of the most valuable gas coals in the country are being largely used for open fires, where the whole of the bye-products obtainable from them are wasted. The value of these products on the market to-day (at Government fixed prices) is, on a low estimate, 6s. 3d. per ton of coal used. But this figure does not approach the real value to the nation of these products—viz., tar, benzol, toluol, naphthas, and ammonia, which are the raw materials for many industries, and the bases of a large proportion of our explosives, disinfectants, dyes, sundry chemicals, fuel oil, and also of much of our fertilizers, of which there is a great scarcity.

Various attempts have been made towards meeting this problem by advocates of low-temperature distillation. But there has not so far been much success in this direction; and, unfortunately, the chances of "smokeless fuel" have been much discredited by financiers, who have been over-anxious to make money too quickly out of two or three of the processes available.

Richard Jones.

155, *Norfolk Street, Sheffield, April 25, 1918.*

P.S.—Since writing the above, I have read the article in the last number of the "Journal," dealing partly with the same subject. I am very glad indeed to see endeavours being made to bring the matter to the front. The reference [p. 149] to Mr. E. G. Bailey's lecture at Boston is very interesting—indicating that there is a general awakening to the importance of the subject.—R. J.

Ground Pitch and Coke Breeze for Boiler Firing.

Sir,—If any of your readers have experience of the use of mixtures of ground pitch and coke breeze for boiler firing, we shall be glad to know what alterations would be necessary in a Lancashire boiler fitted with Proctor stokers of the sprinkler type, to enable such fuel to be economically used.

Munster, Simms & Co., Ltd.

3, *Albert Square, Belfast, April 25, 1918.*

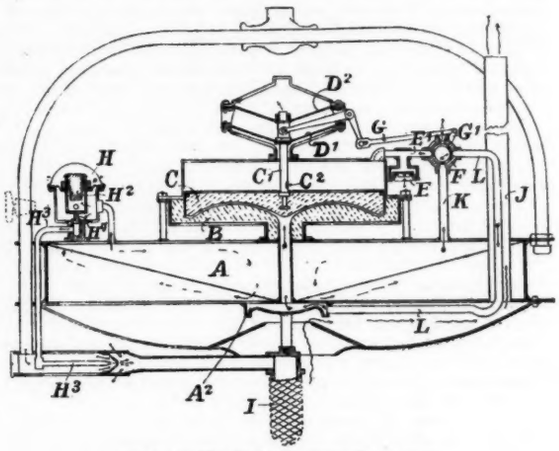
REGISTER OF PATENTS.

Compressing Apparatus for Gas or Air. No. 114,165.

Scott-Snell, Charles, of Wimbledon.

No. 700; Jan. 15, 1917.

This invention relates to apparatus in which air or gas is compressed for use in a bunsen burner, and in which the compression is effected locally by the heat generated by the combustion at the burner.



Scott-Snell's High-Pressure Gas-Lamp.

A section is given of an incandescent gas-lamp supplied with compressed air in accordance with the invention.

The reservoir A and a superheater reservoir A^2 are placed immediately over the bunsen burner; and above are placed a cylinder B and piston C—a hollow rod C^1 connecting the latter to a pair of diaphragms D^1 D^2, which (being differential in diameter) "provide any desirable effective area with long travel arising from large diameter." Pressure acts upon the underside of D^1, by clear passage from the cylinder, and upon the upper side of D^2 through the hollow rod C^1 connecting it with the cylinder. D^1 being the larger diaphragm pressure causes the piston to be lifted. An inlet check valve E admits air to the cylinder when required; and a plug cock F controls the connections between the reservoir and the cylinder, and the cylinder and its discharge to the atmosphere. The cock is operated by linkwork G in conjunction with the piston rod and by means not shown—say, a spring or a balance weight, which makes its full movement suddenly. A diaphragm Valve H, subject to pressure from the reservoir, allows air to flow to the burner I, through the pipe H^3 (only when a pre-arranged force is available), by lifting the valve H^1. A weighted blow-off valve H^2 prevents over pressure.

On account of the weight of the piston, the plug cock, when all is cold, settles with its ports in the position shown. When ignition takes place, the contents of the reservoir are heated, the combustion products passing away through chimneys J; and when pressure in the reservoir has risen sufficiently to lift the piston, it is felt in the cylinder through the pipes K L and the connection E^1. The movement that follows causes air to pass through the heated zone embracing the pipe L, and the surplus air (beyond the highly expanded portion under the piston) finds its way to the reservoir, increasing the pressure generally. At the end of the upward stroke, the plug is suddenly turned one-eighth of a revolution anti-clockwise; thus shutting off the reservoir and pipe E^1, but connecting the pipe L to the atmosphere. The piston then descends; the contents on the under side passing to the atmosphere, and the space above the piston receiving fresh air through the inlet valve E. At the end of the down-stroke, the plug-valve is suddenly turned back to the first position, and the cycle is repeated. The cold air previously driven into the reservoir has in the meantime been acquiring heat by commingling with air already heated and still receiving heat. Thus what may be called an "elastic fluid boiler" is being pumped up until it reaches the pre-arranged pressure which actuates the valve H and starts delivering air to the burner, through the injection pipe H^3.

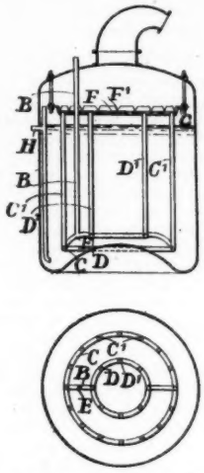
Distillation of Tar.—No. 114,353.

Major, J. L., of Sculcoates, Hull.

No. 5915; April 26, 1917.

This invention is especially applicable to simple stills, and has for its object to render them readily adapted for continuous distillation. The invention is especially applicable in the distillation of tar and petroleum; but it is of general application to the distillation of liquids con-

sisting of mixtures of substances having different boiling points or containing constituents of relatively low volatility and partly or wholly insoluble in the other constituents.



Major's Tar Distillation Plant.

A diagrammatic sectional elevation and plan are given of a still constructed for the distillation of tar. It is mounted within the usual brickwork setting; and the tar is fed in a continuous stream through a pipe B, which passes down through the main body of heated tar to the bottom of the still, where it is connected, by a branch pipe E, with two or more circular pipes C D. These pipes are disposed near the bottom of the still; and the tar passes from them upward through the two series of vertical pipes C^1 D^1 which extend through the heated tar, filling the still up to the discharge level H. The pipes C^1 D^1 pass through and discharge immediately above the bottom of a shallow tray F near the top of the still above the surface of the liquid. The tray is supported by rods fitted with nuts, so that the level of it may be adjusted. The upper ends of the pipes C^1 D^1 extend into the tray; and the level of the tar in the tray is maintained above the orifices of these pipes by **V**-shaped notches F^1 cut in the outer wall.

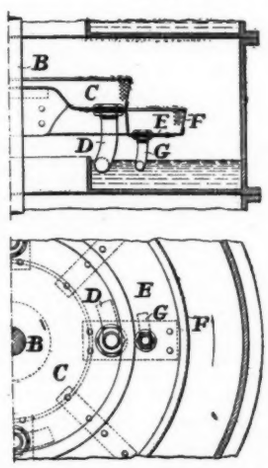
Thus, after being heated to the temperature required, to disengage the vapours which it is required to remove from the tar before mixing it with the partly distilled tar in the body of the still, it flows out of the tray in a number of streams through the **V**-shaped notches. In this way, by subjecting the tar "to heat through pipes disposed in the heated liquid in the still, the liquid is caused to acquire gradually the temperature necessary to the distillation or for the commencement of the distillation, and immediately thereupon to overflow in the upper part of the still under conditions favourable to the disengagement of the lighter vapours and their immediate removal from the still." Thus "the distillation is expedited and is effected with efficiency in the utilization of heat."

Effecting Intimate Contact between Liquids and Gases.—No. 114,370.

Kirkham, Hulett, and Chandler, Ltd., and Hersey, S., of Palace Chambers, Westminster.

No. 8697; June 16, 1917.

This invention relates particularly to apparatus, such as is described in patents Nos. 18,129 of 1908, 23,913 of 1911, and 104,261 of 1916, wherein the liquid which is to be brought into intimate contact with



Hersey's (Kirkham, Hulett, and Chandler's) Gas-Washer Spraying Device.

the gas is projected peripherally under the action of centrifugal force from a rotating spraying device in a chamber through which the gas passes.

A sectional elevation and a plan of part of one form of the proposed spraying apparatus is given.

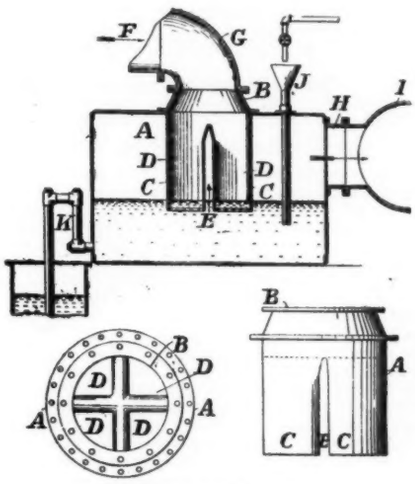
The apparatus is provided with a vertical revoluble shaft B, which extends centrally through it. C is the spraying device comprising a tray carried by the shaft and having a perforated periphery and depending pick-up tubes D. E is the annular plate or tray with a perforated upturned rim F and pick-up tubes G. The ring is beyond the periphery of the tray, and below the level of it; so that part of the liquid which is sprayed outwards by the main device C and rebounds from the outer wall is caught by the tray E, from which it is again projected across the chamber together with the fresh liquid picked up by the tubes G. A large part of the liquid treated in each chamber is, therefore, subjected twice to the action of a spraying device, "so that the mixing effect is intensified, thereby enabling the number of compartments constituting a complete apparatus to be reduced in many cases."

Gas Wash-Boxes.—No. 114,397.

Thuman, F.; a communication from C. S. Chrisman, of West Chester, Penn., U.S.A.

No. 16,290; Nov. 7, 1917.

According to this invention, the dip element or pipe of a gas wash-box comprises a hollow body having at its outlet end depending walls the lower edges of which are horizontal, and portions of which form "re-entrant external spaces," so as to provide an "unusually extensive liquid sealed rim, under the whole of which gas can escape from the dip element," with the result that there is a reduction of back pressure and of bubbles which cause vibratory or pulsatory effect in the wash-box.



Chrisman's Gas Wash-Box.

A sectional view is given of a wash-box embodying features of the invention, and a top view and a side elevation of it.

A is the dip element of the gas wash-box, comprising a hollow body having at one end a circular gas inlet opening B and at the other end projecting continuous walls C, parallel with the central axis of the body and enclosing quadrant-shaped gas openings D commensurate in area with the inlet B, and forming between them a cruciform re-entrant space E and providing in the aggregate a horizontal rim wall at one level, which is extensive in respect to the combined areas of the outlets D. The arrow F and connection G indicate that gas is delivered through the outlets D as from a point beneath the stack valve of a superheater of a water-gas set (not shown). The wash-box is provided with an off-take H communicating with a gas off-take I. J is a water inlet connection and K is a water outlet connection for the wash-box, in which the level of water is maintained at a proper distance above the lower end of the dip element.

The projecting walls C provide in the aggregate an extensive rim wall in respect to the combined areas of the gas outlets D—that is, the relation between the area of the wash-box and the area of the openings usually adopted can be preserved, while at the same time the rim under which gas passes is so long that it can freely escape into the wash-box, and the formation of bubbles, which upon breaking produce a deleterious vibratory effect in the wash-box, is avoided. Again, by reason of the length of the rim, the back-pressure is reduced, and the stack-valve can be lighter.

It is customary, the patentee points out, to connect several gas machines to the trunk I, so that when some of the machines are making gas the wash-box of another machine which is not making gas is exposed to the pressure of the gas made by the first machine; and it is in this connection that it is important to preserve the established ratio between the area of the wash-box and the combined areas of the outlets, so that gas may not pass backward through the seal.

Southampton Gas Company.—The profits of the Company for the six months ended Dec. 31 last amounted to £9781, and the balance available for dividend on the ordinary stock, after payment of debenture interest and other charges, is £6670. The costs of manufacture are still rising, and have now reached such a figure that the income does not meet expenditure. The Directors propose to withdraw from the reserve fund £3046; and they are reluctantly compelled to recommend that a dividend for the half year of 3 p.ct. per annum, amounting to £9716, be paid (less income-tax).

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

The Pontypool Gas and Water Bill was reported from the Select Committee, with amendments.

The Chepstow Gas Bill was read a third time, passed, and sent to the Commons.

HOUSE OF COMMONS.

Progress of Bills.

The Brixham Gas Bill was read a second time, and committed.

The Chepstow Gas Bill was read a first time, and referred to the Examiners.

Select Committee on Sliding-Scale Bills.

On Monday of last week, a Select Committee was appointed, on the motion of Lord Edmund Talbot, to consider and report whether it is expedient that some provision should be made for the temporary modification of statutory requirements with regard to price and dividend in the case of gas undertakings whose financial circumstances have been injuriously affected by causes arising out of the war; and, if so, on what terms and conditions, and whether by private Bill or general legislation. The members nominated were: Mr. Acland Allen, Mr. Anderson, Mr. Allen Baker, Mr. Field, Mr. Fletcher, Mr. Macmaster, Sir William Middlebrook, Mr. Robinson, and Mr. Stewart. It was ordered that the Committee should have leave to hear Counsel upon the matters referred to them, so far as they think fit; and that they should have power to send for persons, papers, and records. Three is to be the quorum.

On the following day, Major Barnston was added to the Committee, also on the proposition of Lord Edmund Talbot.

The Committee are to meet this morning [Tuesday.]

Lighting, Heating, and Power Order.

Mr. Rowlands asked the President of the Board of Trade whether he was aware that many people had been economizing in the use of gas and electricity since the beginning of 1916; and, in these cases, would he arrange for the year 1915 to be taken as the year for comparison.

Mr. Wardle (the Parliamentary Secretary to the Board of Trade), in the course of his reply, said that, in allowing consumers to take the year 1916 or 1917 as the basis for comparison, the Order went as far as was practicable to meet the cases referred to, having regard to the exigencies of the situation.

Mr. Rowlands asked if he understood that they could take the year 1915 in cases of hardship.

Mr. Wardle replied in the negative.

Mr. Gilbert asked the President of the Board of Trade whether he was aware that certain gas companies in London, with a view of reducing the consumption of gas, were suggesting to slot meter consumers that they should be limited to a shilling's worth of gas per week; and, as this kind of consumer was largely a tenement occupier in working-class districts in London, and used gas both for lighting and cooking purposes, and that this quantity was quite inadequate for such household use, whether he could see his way to instruct the gas companies to allow a larger amount per week to all holders of slot meters.

Mr. Wardle replied that the President of the Board of Trade regretted that he did not see his way, owing to the necessity which he had already explained to the House of a substantial reduction in the consumption of gas, to modify the minimum allowance specified in the schedule to the Lighting, Heating, and Power Order, 1918.

Mr. Rowlands asked Mr. Wardle if he was aware, in the case of a number of persons who had had gas-stoves put in, that the restriction made it quite impossible for them to cook their food; that they would have to resort to an extra supply of coal; that they were out of an adequate supply of coal; and that they could not get supplies.

Mr. Wardle replied that if a case was given to him he would have inquiries made.

Research Laboratory for Gas Fuel.

Sir A. Mond, replying to a question raised in the course of the debate on the Civil Service Estimates, on the motion "That a sum, not exceeding £138,250, be granted to His Majesty, to complete the sum necessary to defray the charge which will come in course of payment during the year ending on the 31st day of March, 1919, for expenditure in respect of sundry public buildings in Great Britain, not provided for in other votes," pointed out that the sum of £95,000 was required in connection with the erection of a research laboratory for gas fuel. [The Estimates for Civil Services show that the original total estimate was £120,000, and the probable total expenditure to March 31 this year £25,000.]

Fatality at the Grimesthorpe Gas-Works.—A verdict of "Accidental death" was returned by a Sheffield City Coroner's Jury, who inquired into the circumstances surrounding the death of a labourer named William Reed. He was employed at the Grimesthorpe Gas-Works, and was found unconscious on a heap of coke. He was admitted to the Royal Infirmary, and died from fracture of the base of the skull. A brick was lying two yards away from where the deceased was found unconscious; but there was nothing to show whether it had been thrown at the man or fell from a gantry under which he worked, or whether it was there by pure coincidence at the time of the accident. A possible explanation of the man's injuries was that, if he rose up quickly from a stooping position, he might have knocked his head against a lever which he was working under a coke-shoot.

ALDERSHOT GAS BILL.

HOUSE OF LORDS COMMITTEE.—Tuesday, April 23.

(*Before Lord* Forteviot, *Chairman, Lord* Leigh, *the Duke of* Buccleuch, *Earl* Stafford, *and Earl* Eldon.)

When the Committee met this morning, after an adjournment since Friday [*ante*, p. 151-2],

Mr. Vesey Knox, K.C., for the promoters, said that an agreement had been come to with the local authorities on all the points at issue. The Company had been extremely anxious to work on friendly terms with the local authorities, as for the most part had been the case hitherto; and for this reason they had made concessions which went really beyond what the Company themselves thought was right. In these times, however, there was no doubt that the Company and the local authorities should work together to the fullest possible extent; and an agreement had been come to on these lines. In the first place, the capital would be not £200,000 and borrowing powers, but £150,000 and borrowing powers—making £200,000 in all. So far as electricity was concerned, it had been agreed that the Company should only ask for the revival of the lapsed powers to supply electricity in Ash and Seale. They already had electricity powers in the remainder of the "B" area; but for the present the Company would not ask for similar powers in the "C" area. With regard to the auction clauses, it was proposed to take the model form; so that the Company would not have the power, as was proposed in the Bill as deposited, of selling stock to consumers and employees otherwise than by tender, so far as new capital was concerned. A differential in price as between Aldershot and the "B" area of a maximum of 3d. per 1000 c.ft., from the beginning of a period of one year after the termination of the war, was accepted. Other small matters had also been adjusted, including that of the level-crossing.

The Chairman asked as to the position of the Company in regard to the erection of stand-pipes for supplying gas to motor vehicles.

Mr. Vesey Knox said it had been agreed that the County Council, as the road authority, should control this matter. In regard to the Board of Trade report, in which it was suggested that a purchase clause should be inserted as affecting the new electricity supply powers, he did not think such a clause now would be of much value, having regard to the manner in which these powers had been cut down.

The clauses were subsequently adjusted, and the Bill in the agreed form was ordered to be reported for third reading.

In reporting the evidence of Mr. R. W. Edwards on p. 152 of last week's issue, it was stated that he estimated the consumption in ten years at 577 million c.ft., or in seven years at 358 millions. The figures given by Mr. Edwards did not, however, represent the estimated output of gas in ten or seven years, but the prospective increases at the periods named over the present output. The following figures will, no doubt, make this point clearer:

Year.	Make in Thousands.	
1918	584,649	
1919	628,497	
1920	675,634	Increase in five years = 236,918,000 c.ft.
1921	726,306	
1922	780,778	
1923	839,336	Increase in seven years = 358,426,000 c.ft.
1924	902,286	
1925	969,957	
1926	1,042,703	Increase in ten years, = 577,045,000 c.ft.
1927	1,120,905	

CHEMICAL MANUFACTURERS AND THE ELECTRIC POWER BILLS.

Of the Electric Power Supply Bills deposited in Parliament this session, three asked for very wide powers in respect of the working-up of residual products and the manufacture of chemicals. These were the Shropshire, Worcestershire, and Staffordshire, the Gloucestershire, and the County of London Electric Power Bills. Clause 6 of the Shropshire Bill is typical of the powers that were sought. It was in the following terms:

Clause 6—(1) The Company may, upon the land described in Part. I. of the first schedule to this Act, and therein called the Stourport site, or any part or parts thereof, lay down, erect, maintain, work, and use the station or stations or works for producing, generating, transforming, using, transmitting, conveying, and distributing energy or power, and for the manufacture of gas for the purpose of generating energy, with all necessary and convenient buildings, sidings, engines, dynamos, batteries, accumulators, storage works, motors, generators, machinery, appliances, apparatus, and conveniences, and may accordingly produce, generate, transform, use, transmit, convey, and distribute energy or power, and manufacture gas.

(2) The Company may also upon such land, or any part or parts thereof, manufacture, produce, work-up, convert, use, sell, and dispose of any material, products, matters, and things arising or used in the process of the generation or transformation of energy or power, and any electro-chemical, electro-metallurgical, and atmospheric products, and any residual products arising directly or indirectly from the manufacture of gas by them.

The Shropshire Company proposed to erect a larger new generating station, and to extend their area of supply. The County of London Company sought an extension of time for the use of certain lands at Romford for the erection of a new generating station authorized in 1913, and incidentally took the opportunity to ask for extended powers on the lines of the clause set out above.

The Gloucestershire Bill sought powers to take additional lands in respect of which all the rights in the above clause were asked.

Against all three Bills the Association of British Chemical Manu-

facturers petitioned. In March, the promoters of the Gloucestershire Bill withdrew the measure. As regards the other two Bills, the Association alleged that the powers sought were quite unprecedented for, and entirely outside the scope of, an electric supply company which had for its object the generation and supply of electrical energy. It was urged that, if sanctioned, such powers would enable electric supply undertakings to compete under favoured conditions with the members of the Association of British Chemical Manufacturers in the manufacture and sale of chemicals. It was further pointed out that the powers asked for would enable the promoters to convert the residual products resulting from the manufacture of gas, either alone or in combination with other chemicals and products, into various chemicals, and also to manufacture other chemicals and sell them in the open market in competition with the members of the Association. The Bills further asked for powers in excess of those of the Model Bill relative to the conversion of residual products arising directly or indirectly from the manufacture of gas. It was submitted that Parliament never intended electric supply companies to manufacture chemical products, and, moreover, no public advantage could be shown for the granting of such powers.

In the case of the County of London Bill, negotiations were entered into between the promoters and the Association, with the result that the Bill was withdrawn from a list of Opposed Bills in the House of Lords and sent to the Unopposed Bills Committee. The terms of the settlement were that the Company undertook not to manufacture on the site scheduled in the Bill any bye-products of coal or other minerals or electro-chemical, electro-metallurgical, or atmospheric products.

The opposition to the Shropshire Bill was carried on until it came before a Committee of the House of Lords presided over by Lord Muir of Mackenzie, which completed the hearing of it on Thursday last. During the course of the proceedings, however, Mr. Vesey Knox, K.C., for the Association, mentioned that terms had been arranged, to the effect that the Company undertook, during the continuance of the war, not to attempt to get powers for the manufacture of gas or any chemicals or other productions which had been objected to. In other words, the part of clause 6 relating to gas, residual products, chemicals, &c., has been struck out of the Bill.

Apropos of the Electric Power Bills generally, it is not without interest to note that the Board of Trade are asking that a clause should be inserted providing that the powers obtained under them shall not be allowed to prejudice any national scheme of electricity supply that may be evolved on the lines of the report of the Coal Conservation Sub-Committee; and this is being agreed to by promoters.

MISCELLANEOUS NEWS.

GAS TRACTION COMMITTEE.

Interim Report.

The promised interim report of the Inter-Departmental Committee on Gas Traction has now been issued. It will be recalled that the Committee were appointed to consider and report upon:

(1) The employment of gas in substitution for petrol and petroleum products as a source of power, especially in motor vehicles, and the manner in which such gas may be supplied, stored, carried, and used, with due regard to the safety of the public.

(2) The action, if any, which should be taken by His Majesty's Government to encourage and safeguard the use of gas for this purpose.

Witnesses were examined on behalf of a number of bodies, including the Society of British Gas Industries (Meter Section), the Rotary Meter Company (1905), Ltd., the Motor Gas Equipment Association, the Institution of Gas Engineers, and the British Commercial Gas Association. It appeared to them desirable to conduct the inquiry in two stages—the first relating to present war conditions, and the second to such altered circumstances as may be expected subsequently. After full and careful consideration and discussion of the evidence, they submit unanimous conclusions and recommendations concerning: (*a*) The propulsion of motor vehicles by the employment of gas carried in flexible containers at or slightly above atmospheric pressure; (*b*) approved limits to immediate experimental uses on a commercial scale of gas under compression for traction purposes; and (*c*) authority to enable the Committee to proceed with necessary experimental investigations. They will, in continuing the work, devote attention to the conditions which should govern the extended use of gas under compression as a source of power when the necessary appliances and plant are obtainable.

CONCLUSIONS AND RECOMMENDATIONS.

(*a*) SUPPLY AND EMPLOYMENT OF GAS IN FLEXIBLE CONTAINERS.

(5) *Safety and Simplicity.*—We are satisfied that ordinary town gas can be effectively, safely, and promptly substituted for motor spirit as a fuel for use in internal-combustion engines of the types which are commonly fitted to motor vehicles, without reduction of the compression-space in the cylinders of such engines.

(6) *Economy.*—It is reasonable, from a commercial point of view, to adopt a mean consumption of 250 c.ft. of ordinary town gas—with (say) a gross calorific value of 490 to 500 B.Th.U. per cubic foot—as the equivalent of one gallon of motor spirit; and on this consumption-ratio, gas at 4s. per 1000 c.ft. shows the same fuel-cost as motor spirit at 1s. per gallon, apart from interest on cost of installation and the maintenance of flexible containers and filling arrangements.

(7) *Gas-Bags.*—Flexible containers should be made of fabric which complies with the specification in the appendix accompanying this report. The working life of such a container may be considered to be normally about eight months; and this may probably be increased by as much as 50 p.ct. when the material is continuously protected from the action of light, and otherwise by a suitable covering. Leakage of gas due to the porosity of inferior fabrics may after one month of use equal the actual gas consumption.

(8) *Supply.*—It is desirable that owners of gas undertakings should themselves be suppliers of gas for traction purposes, and that they should also allow re-sale through the intermediary of motor depôts and like establishments. There should be no restrictions, except in so far as shortage of coal or other war conditions may render the imposition of control or priority necessary upon the drawing of supplies of gas for traction purposes through suitable meters at consumers' premises or private filling-stations.

The erection of a stand-pipe, pillar-pipe, or any filling installation on other than private property should be subject to approval of the site by the local authority concerned, and, if agreement is not reached within 14 days of delivery of written notice and application, the owners of the gas undertaking or other applicant should have a right of appeal to the Local Government Board to appoint an inspector to decide between the parties.

The deviation of any gas-propelled motor-bus from an omnibus route which was established prior to March 1, 1916, for the purpose of obtaining occasional or regular supplies of gas, or of avoiding any bridge or other obstruction, should not be treated as a breach of section 20 of the Local Government (Emergency Provisions) Act, 1916.

(9) *Measurement.*—Reduction of demands upon both rationed material and labour will be facilitated by the elimination, wherever possible, from new installations of the older methods of measurement. The installation of new meters in the construction of which tin-plate is required can, we believe, in many instances be obviated by substituting a rotary, inferential, or other measuring instrument, the manufacture of which will require little or no rationed material. It is desirable that the Board of Trade should empower local authorities to test and stamp such instruments for this purpose, provided that they are accurate within 2½ p.ct. *plus* or *minus* while capable of passing gas, and that sellers and consumers of gas should concur in their use.

Objection should not be raised to the sale of gas for traction purposes, on agreement between seller and consumer, by acceptance of mean volume per filling in respect of individual flexible containers. With a view thereto, the capacity, as ascertained at a pressure of 30 in. of a column of mercury and a temperature of 60° Fahr. within the container, or as adjusted by calculation to comply with those conditions, should be certified and stamped on the container fabric, or on an attached identification label or disc.

(10) *Control of Filling.*—Where the pressure in the supply pipe to the container may at any time exceed 2 in. of water above the pressure of the atmosphere, it is advisable that, instead of relying solely upon hand-control, the physical movement of the container should, at a point lying between 9-10ths and full inflation, so actuate an automatic cut-off valve on the gas-inlet pipe as to stop the flow of gas into the container before the point of full inflation can be reached.

(11) *Standard Connection.*—The gas inlet to the container on any vehicle in general use should be of iron gas-pipe, of 2½-in. bore, screwed externally with the British standard pipe-thread to take a union for that size of pipe; and such union should be fitted permanently to the end of the flexible tube or other connecting-pipe through which the gas is passed from the source of supply.

(12) *Price of Gas.*—The price of gas for traction purposes should not exceed the ruling price per 1000 c.ft. in any area of supply, subject to the district rates of discount (if any) according to quantity, if the supply is taken at the consumer's premises or private filling-station on any agreed system of measurement.

There should be a charge of not more than 2d. per 100 c.ft. over and above the ruling domestic rate for the area, in respect of any supplies for traction purposes which are drawn at any filling-station or depôt other than at the consumer's premises or private filling-station, in order to cover labour and service, with a minimum of 6d. per filling.

(13) *Depôt Storage under Pressure.*—The consideration of this branch of the subject has been deferred with a view to evidence being taken thereon during the later stage of the inquiry.

(14) *Attachment.*—Flexible containers should be constructed with a valance extending the whole length of their compass along a horizontal line at not more than half the height of the container when fully inflated. The finished valance should be of at least double the tensile strength of the fabric in the body of the container; and, in the absence of means of continuous attachment to the vehicle's structure or roof, it should be eyeletted to receive metal rings at intervals of not more than 2 ft. and thereby be securely held to the roof of the motor vehicle or to rails or a framework thereon.

Any composite container—*i.e.*, one which has a lower box-portion made of boards or scantlings lined with fabric or otherwise rendered gas-tight—should, as regards the collapsible portion, comply with the specification given in the appendix, and the gas capacity of the collapsible portion should be approximately the same as that of the rigid portion.

A flexible container should be mounted on, and attached to, any motor vehicle in such a manner that, on partial or total deflation during use, the collapsing portion shall at all times fall within the base of a retaining tray, a box-sided structure, or covered scantlings, of a minimum height of 18 in.; and due provision should be made to prevent "chafing" of the fabric.

The over-all height of any container and the vehicle carrying it should at no time exceed 17 ft. from the ground.

No container should at any time extend beyond the greatest over-all width of the motor vehicle to which it is attached.

When a flexible container is carried on a trailer, the fabric of the container should be protected by a separate covering of canvas or other material stretched over hoops or other sufficient supports of wood or metal, or by a light enclosing structure of wooden laths or equivalent.

There should be a positive cut-off valve and an automatic non-return valve between the flexible container and the point of gas delivery to the carburettor-intake or the induction-pipe of the engine.

(15) *Use.*—There should be top-ventilation to the outside atmosphere, in any building which is used, either permanently or temporarily, for the purpose of housing or otherwise accommodating any vehicle which is equipped with a flexible container with gas inside it.

Any flexible container should be completely deflated if the vehicle to which it is attached has stood idle for more than two weeks.

It is recommended that, in the event of a priority of gas supply being established, any differentiation in respect of the quantities of gas sold for traction purposes should be on the basis of the priority which attaches to the purposes for which the transport is required.

It is recommended, having regard to the satisfactory insurance testimony, that gas-equipped motor vehicles be admitted to dock premises and wharves without the imposition of any special restrictions.

(*b*) Approved Uses of Gas under Compression during the War Period.

(16) *Semi-Rigid Containers.*—It is undesirable that semi-rigid containers of rubber and canvas or other proofed fabric should at present be allowed to be charged with gas to a pressure greater than 90 lbs. on the square inch, or should be of a larger internal diameter than 4 in.; and even with these limitations containers of this class are, in the opinion of the Committee, unsafe if not properly armoured with galvanized steel wire of 0·012 in. diameter (No. 30 B.W.G.).

Encouragement should be given to the construction and use of semi-rigid containers of rubber and woven wire, up to working pressures of 300 lbs. on the square inch; and it is recommended to the Controller of Priority that he afford such assistance as may be necessary to permit developments of this description of container.

(17) *Metal Cylinders.*—It is desirable to encourage forthwith, under special licence from the Board of Trade where necessary, a limited number of experiments on a commercial scale with compressed gas in rigid metal cylinders, plain or wire-wound, at pressures up to at least 1800 lbs. (120 atmospheres) on the square inch, in connection more particularly with certain of the larger motor-omnibus undertakings and the transport departments of certain of the more important municipal authorities, in order to obtain data for dealing with this post-war development.

(*c*) Technical Investigations.

(18) It is expedient to proceed with experiments and tests in connection with the determination of factors affecting portable gas-generating plants, and the commercial use of gas for traction purposes in containers at high pressures, together with questions relative to liquefaction, absorption, and enrichment, as well as in regard to improvements in the existing arrangements for effecting the admixture of gas and air in the requisite proportions under varying conditions. Authority is, accordingly, now asked to combine with the second stage of evidence by witnesses independent investigations by an expert Sub-Committee, under our general direction and control.

It is recommended that, where necessary, any such experiments and tests should be conducted under a special licence, granted by the Board of Trade, in respect of any gas consumption involved.

(Signed) Boverton Redwood (Petroleum Executive), *Chairman*.
,, A. Cooper-Key, Major (Home Office).
,, E. D. Jones (Board of Trade).
,, H. H. Law (Local Government Board).
,, Arthur Churchman (Ministry of Munitions of War).
,, W. Doig Gibb (Ministry of Munitions of War).
,, Charles Carpenter (Ministry of Reconstruction).
,, E. S. Shrapnell-Smith (Petroleum Executive).
,, W. Worby Beaumont (Metropolitan Police).
,, J. Ollis (London County Council).
,, R. K. Bagnall-Wild, Lt.-Col., R.E. (Institution of Automobile Engineers).
,, F. W. Goodenough (British Commercial Gas Association).
,, Wm. Kay (Manchester Corporation).
,, G. W. Watson (Commercial Motor Users Association).

APPENDIX.

Specification for Town-Gas Container Fabric.

(1) Textile Components.

The textile components are to be:

(*a*) Outer Texture.—A cotton Wigan, preferably dyed khaki. Weight, 4½ to 5 oz. per square yard. Width, 42 in. Ends per inch, 60. Picks per inch, 60.

(*b*) Inner Texture.—A grey cotton Wigan. Weight, 4½ to 5 oz. per square yards. Width, 42 in. Ends per inch, 60. Picks per inch, 60.

(2) Construction.

(*a*) Fabric.—The fabric is to be two-ply diagonally-doubled with the biased ply on the inside. Equal quantities of right-handed and left-handed biased fabrics are to be prepared by the manufacturer.

(*b*) Proofing.—The proofing is to contain not less than 90 p.ct. of first grade native or plantation rubber uniformly and evenly spread between the doubled fabric.

(*c*) Weight of proofing.—To be 6 oz. per square yard between the plies.

(*d*) Method of proofing.—The dried fabric must be given a priming coat thoroughly to impregnate the texture, followed by not less than six coats to build the proofing to the required weight.

(*e*) Vulcanization.—To be by the "hot" process employing steam heat. Dry heat and the "cold" process are prohibited.

(3) Tests on Fabric.

(*a*) Strength.—The strength of the finished fabric shall be not less than: Warp, 60 lb. per in.; weft, 60 lb. per in.

The tests will be made on a "constant rate of loading" machine. The rate of loading to be 150 lbs. per minute per inch width, and the size of the specimens to be 2 in. wide and 7 in. between the jaws of the machine.

(*b*) Permeability.—The permeability of the fabric to hydrogen must not be more than 10 litres per square metre per 24 hours when tested on the N.P.L. type of apparatus at a constant temperature of 15·5° C., and an excess hydrogen pressure equal to one inch of water.

N.B.—10 litres per square metre per 24 hours is approximately 0·3 c.ft. per square yard per 24 hours.

EXAMINATIONS IN "GAS ENGINEERING."

City and Guilds of London Question Paper.

The following were the questions put to candidates last Saturday week in the examination in "Gas Engineering," held under the auspices of the City and Guilds of London Institute. The Examiner was Mr. Samuel Glover, of St. Helens. The maximum number of marks obtainable is appended to each question.

Grade I.

1. Show by sketches the manner in which a segmental horizontal retort is constructed and supported in its setting. Half-length of one retort will suffice. Put in mouthpiece flange connected by bolts, the number of which is to be stated. [40 marks.]

2. Draw a cross section of an approved hydraulic main, with a dip-pipe to scale, fixed in proper relationship to the area and depth of the hydraulic main, and show the method of regulating the seal. Put in position the gas-outlet, tar-outlet, liquor-outlet, and any other details that you desire to specify. [40.]

3. What are the improved methods of working horizontal retorts by machinery to which may be correctly attributed improved results per ton of coals? State what effect the securing of a larger production of gas per ton has upon the bye-products obtainable [45.]

4. What are the chief features to be looked for in fire-resisting materials of the most serviceable quality for constructing retorts and the various portions of their settings? Specify the most suitable quality of jointing material to be used in such constructions. [45.]

5. Specify the order of fixing, and the best method of working, the necessary apparatus for exhausting, tar extracting, condensing, and scrubbing of coal gas as it is made. [40.]

6. Sketch in section an 18-inch gas-valve most suitable for use with unpurified gas on a coal-gas works. [30.]

7. In the process of purifying coal gas, what is the operation of revivifying *in situ?* To what purifying material is this applied? What apparatus is necessary for the most accurate carrying out of the process, and to what extent can it be wisely applied? Give the chemical changes produced at each stage. [35.]

8. Draw a range of steam-pipes connecting two horizontal boilers with an exhauster-house, with two engines connected, showing the necessary valves and steam-traps for drainage. [30.]

9. What is the most economical quality of gas to manufacture for general use by the public in modern pieces of apparatus? For what values, and by what means, should this gas be tested? [30.]

10. Show by a sketch part section of a brick and puddle gasholder tank. Include (*a*) the water-level overflow, (*b*) the outlet-pipe from the inside of tank through dry well and station governor to outlet on to district. [40.]

Final.

1. What are the conditions necessary to be taken into consideration before deciding the sort of machinery which can be most efficiently worked for coal handling, charging and discharging the retorts, and for coke handling in a 3-million per diem retort-house on a works not in a colliery district. [50 marks.]

2. (*a*) What effect have modern gas-making methods on the quantity and quality of bye-products? (*b*) State what you would consider to be good gas tar from a gas-maker's point of view, and what steps should be taken to secure the most valuable production of hydrocarbons in the destructive distillation of gas-making coals. [45.]

3. Show by a front elevation the arrangement and number of retorts in a modern horizontal retort setting which can be most economically heated and worked. [30.]

4. Give the chemical composition of a suitable coal gas for general town's use, and state the effect on the physical properties of each of the components. Which are natural diluents, and how far should added diluents be admitted? [40.]

5. In the absence of a supply of gas oil for use in a carburetted water-gas plant during a period of maximum demand on all gas-producing plant, what use can the carburetted water-gas plant be best put to, and with what general effect upon the consumer's supply for (*a*) light, (*b*) heat, (*c*) power? [40.]

6. What is concentrated liquid ammonia? How produced on a gas-works, and what the standard strength at which it is sold? [35.]

7. Describe either or both of the following instruments: (*a*) A modern calorimeter, (*b*) a reliable pyrometer, and explain the physical laws under which each one acts. [30.]

8. Draw sufficient of a steel gasholder tank on its foundation to show its diameter and depth, and the strength of each row of plates when the capacity of the holder is 2 million c.ft. Show the method of fixing the inlet-pipe, and calculate the water contents of the tank when filled to working level, in tons. [45.]

9. Describe some of the applications of power for labour saving which can be introduced into the work of a purifying house [a general sketch of a purifying house may be used]. [35.]

10. State what you would arrange to do, and the order of doing it, in the following emergency: An above-ground trunk main, 20 in. diameter, has become smashed, and must be repaired in a sufficient measure to enable the works to be restarted in a few hours. [40.]

Local Authorities and Gas Bills.—At a meeting of the Executive Council of the Rural District Councils' Association, a letter was read from Messrs. Martin & Co., the Parliamentary Agents acting for a Committee of certain local authorities not owning gas undertakings, suggesting that the Association should join their Committee in presenting the case of local authorities not owning gas undertakings before the Select Committee of the House of Commons to consider whether in all the circumstances any temporary modification of the existing statutory requirements with regard to price and dividends, or any other form of relief, should be afforded in the case of those undertakings whose financial circumstances have been or may be injuriously affected by causes arising out of the war. The Executive decided to take no action in the matter.

THE PAST YEAR AT MANCHESTER.

Gas Consumption and Finances.

A Special Meeting of the Manchester Corporation Gas Committee was held last Wednesday—Alderman Kay presiding—to consider the estimates for the ensuing financial year.

The gross profit for the year just closed, after making full provision for the renewal of plant, was £235,027, as compared with the estimate of £162,773—an increase of £72,254. The capital outlay at the beginning of the year stood at £3,099,347. The profits have been appropriated as follows: To meet the deficit, £53,951; interest, £41,579; statutory sinking fund, £63,331; and to the city fund in aid of the rates, £25,000. This left a surplus, after meeting certain capital outlay, of £49,666 to be carried forward to the current year's accounts.

The increase in the gross profits is attributable mainly to a higher consumption of gas and to the larger income derived from residuals—coke, tar, ammoniacal liquor, &c. These latter yielded £42,427 in excess of the estimate; while on the expenditure side coal and oil fell considerably below the estimate. The total number of consumers is 194,938—an increase of 2052 in the year. The output of gas has increased 2·49 p.ct.

The estimates for the year ending March 31, 1919, were submitted and approved. After meeting the usual capital charges of interest and sinking fund, and the contribution to the city fund in aid of the rates, which was recently fixed by the Council at 1 p.ct. on the capital outlay, and amounts to £30,993, it is estimated there will be a deficit to be carried forward at the close of the year of £19,979. The Committee, in view of the financial position disclosed by the statements submitted for their consideration, do not propose any change in the price of gas at present.

It was reported by the Superintendent (Mr. Fredk. A. Price) that during the year ended March 31 last the output of gas was 6049 million c.ft., as compared with 5902 millions for the previous year. Notwithstanding labour and other difficulties, there has been during the year an increase of 6132 heating appliances fixed. There has been a decrease of 381 consumers through ordinary meters and an increase of 2433 through automatic meters, making a net increase of 2052. The total number of consumers at March 31 was 194,938, of whom 80,158 used automatic meters. The year was commenced with a deficit brought forward of £53,951; and, notwithstanding the increased wages given under the various awards by the Committee on Production, and an advance of 2s. 6d. per ton on coal, the year ended with a surplus profit amounting to £49,666. The wages increases over pre-war rates will amount in the year to £118,614; and the cost of the 2s. 6d. per ton additional on coal means an increase in the yearly coal bill of £52,500. On the other hand, the increase of 6d. per 1000 c.ft. in the price of gas has yielded in the three completed quarters £110,452. Out of the 862 employees of the Committee who have joined the forces since the commencement of the war, 83 have made the supreme sacrifice.

Both Alderman Kay and Mr. Price were complimented on the excellent results achieved.

COALITE LIMITED.

There was a meeting of Coalite Limited, at the Liverpool Street Hotel, E.C., last Wednesday, at which were presented the report and accounts for the year ended Dec. 31.

The report stated that by the appropriation of the surplus of reserve account, the item of general expenditure in the balance-sheet was reduced by £12,495. The Directors have succeeded in arranging with various creditors for a substantial reduction of their claims. This, with the assistance of certain other credits, made the balance added to this item only £190 for the year under review. An agreement has been entered into with Low-Temperature Carbonization, Ltd., to manage the business for a term of ten years. Effective progress in dealing with the Company's interests in foreign countries and the Colonies can, however, hardly be looked for until after the termination of the war. The Company's patents in foreign countries and the British Dominions were maintained and added to last year.

The meeting was presided over by the Chairman (Mr. H. Willmott), who, in moving the adoption of the report and balance-sheet, said he thought he was justified in congratulating the shareholders upon the materially improved condition of the Company's affairs as compared with what existed this time last year. The balance-sheet was materially better in many respects. The invention and patent rights for the coalite process throughout the world, with the exception of Great Britain and Ireland, remained the same, being assessed at the purely nominal figure of £5000. It would be remembered that he informed the shareholders last year that the Board had received an option to take 10,000 of the preference shares of the Barnsley Company on favourable terms. This option had now been exercised to the extent of 3000 shares, which appeared among the assets at the price paid for them—namely, £2250. The holding in British Coalite first mortgage debenture stock was less by about £500; but, on the other hand, they had acquired up to the completion of the financial year a further 8250 ordinary shares and 5000 deferred shares—all fully paid—which appeared in the balance-sheet at cost. This, on the basis of the present quoted price of both classes of shares, showed a handsome profit. In regard to the reserve, the balance of the proceeds of the sale of British Coalite deferred shares—namely, £12,266—had been transferred to the credit of the general expenditure account, substantially reducing this item. Considering that the Company had not been in effective operation during the past year, owing to the unhappy continuance of the

Gas Cookers.

We know your Consumers' needs are fast growing, and we are working to keep up supplies.

Don't wait until the orders pile up, but **write us now** for **prices and deliveries of HIGH-GRADE, INTERMEDIATE, and SLOT COOKERS.**

R. & A. MAIN, Ltd.

WORKS: Gothic Works, EDMONTON, N. 18; Gothic Works, FALKIRK; and Gothic Works, BIRMINGHAM.

SHOWROOMS and BRANCHES: 25, PRINCES STREET, OXFORD CIRCUS, W. 1; 82, Gordon Street, GLASGOW; 18, Severn Street, Deansgate, MANCHESTER; 97, Millfield, BELFAST; 333, Queen Street, MELBOURNE; and 12, Cunningham Lane, Pitt Street, SYDNEY, N.S.W.

war, the shareholders would find it a special matter for congratulation that the debit of general expenditure for the year was covered by the very small sum of £190 odd. On the liability side of the balance-sheet also it would be seen that the position was a greatly improved one as compared with last year. At the general meeting of the British Coalite Company last January, the Chairman (Mr. W. J. Fisher) gave a brief description of the coalite process; and this he could not do better than quote. As to the general position of their Company, it might be regarded as quite satisfactory. An agreement had been entered into with Low-Temperature Carbonization, Ltd., under which that Company were appointed managers of the business of this Company for a term of ten years from Oct. 1 last year. As a pendant to this agreement, Low-Temperature Carbonization had also been appointed managers of the Barnsley works, and were arranging with the British Coalite Company for putting up works on the model of the Barnsley plant in various parts of the country. They were, he understood, in close relation with important people for the exploitation of the process generally. Unfortunately, they were not likely to enter into the larger enjoyment of the arrangement, owing to the impossibility of normal industrial development in most of the countries of the world in consequence of the war. They might hope, however, when peace came again, that the pioneer work now being done in Great Britain would redound immediately to their advantage, by making it possible to exploit their process in most, if not all, the principal countries of the world. The fact that Low-Temperature Carbonization were prepared to commit themselves to an expenditure of £30,000 spread over five years, might be taken as a sufficient earnest of their intention to work the process energetically; and it ensured their Company, during what could not have failed to be lean years, an annual revenue that would not only suffice for all administrative requirements, but might enable them to pay a small dividend while awaiting fuller development. Had they been in the enjoyment of unlimited funds, they would naturally have preferred to undertake the development of the process themselves; but, unfortunately, for very many years past the Company had had considerable difficulty in financing itself. In the circumstances, the shareholders were to be congratulated on the arrangement that had been concluded.

The motion having been formally seconded, Colonel Godfrey asked, in view of the fact that Low-Temperature Carbonization, Ltd., were going to manage the business for ten years, and that progress in dealing with the Company's foreign interests could hardly be looked for until after the termination of the war, whether economy could not be effected in Directors' fees, Secretarial staff, and general expenses. Mr. Nicholls inquired whether they could be told what was the position of the Barnsley undertaking. The Chairman replied that Low-Temperature Carbonization were not going to interfere in the administrative side of their business. The agreement entered into, on the other hand, would want watching over closely. As to the position at Barnsley, any desired information could be obtained at the office.

The report was adopted; and Mr. Willmott was re-elected a Director.

INCOME-TAX YEAR 1918-1919.

Table of Deductions.

By George Rogerson, Accountant, of Northwich.

The amount of tax to be deducted from periodical payments in respect of annuities, interest, dividends, and ground rents may during the current income-tax year be computed on the following basis:

(A) Period in respect of which annuity, dividend, rent, or interest is payable.

(B) Amount in the £ to be deducted for tax.

(A) Three months ending—	(B) s. d.	(A) Half year ending—	(B) s. d	(A) Year ending—	(B) s. d
Mar. 31, 1918	5 0	Mar. 31, 1918	5 0	April 30, 1918	5 1
April 30 ,,	5 4	April 30 ,,	5 2	May 31 ,,	5 2
May 31 ,,	5 8	May 31 ,,	5 4	June 30 ,,	5 3
June 30 ,,	6 0	June 30 ,,	5 6	July 31 ,,	5 4
July 31 ,,	6 0	July 31 ,,	5 8	Aug. 31 ,,	5 5
Aug. 31 ,,	6 0	Aug. 31 ,,	5 10	Sept. 30 ,,	5 6
Sept. 30 ,,	6 0	Sept. 30 ,,	6 0	Oct. 31 ,,	5 7
Oct. 31 ,,	6 0	Oct. 31 ,,	6 0	Nov. 30 ,,	5 8
Nov. 30 ,,	6 0	Nov. 30 ,,	6 0	Dec. 31 ,,	5 9
Dec. 31 ,,	6 0	Dec. 31 ,,	6 0	Jan. 31, 1919	5 10
Jan. 31, 1919	6 0	Jan. 31, 1919	6 0	Feb. 28 ,,	5 11
Feb. 28 ,,	6 0	Feb. 28 ,,	6 0	Mar. 31 ,,	6 0
Mar. 31 ,,	6 0	Mar. 31 ,,	6 0		

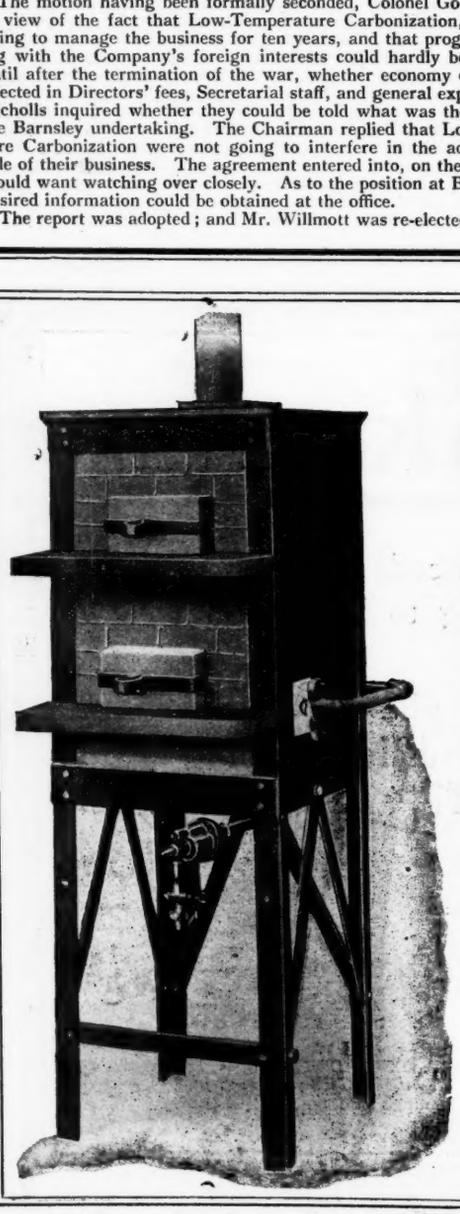
Note.—Dividends on British, Foreign, and Colonial Government and Corporation stocks are taxed at the rates in force when the dividends are received.

THE PAST YEAR'S WORK AT NELSON.

Good Results from Steaming in Verticals.

Reporting to the Nelson Corporation Gas Committee on the working for the year ended March 31, Mr. Dugald Currie (the Engineer and General Manager) says the department has had a most successful year, having regard to the many disturbing factors which had to be contended with, including an additional advance of 2s. 6d. per ton on the cost of coal, and the several increases in wages granted to the employees. The expenditure shows a decrease of £48 as compared with the estimates; and the total revenue has exceeded the estimates by £2900.

The satisfactory financial results are in a great measure due to the large saving in coal effected during the year, as a result of improved methods of carbonization having been adopted at the Brierfield works



Davis High Speed Steel Furnaces

For Town's Gas and Air Blast

This Furnace (D.H.S.T. 100) is an intermediate size designed to meet the requirements of works needing a medium furnace with all the merits of the larger Davis H.S.S. Furnaces at a moderate price.

It has two heating chambers—the upper one for preheating, and the lower for raising to the final hardening temperature. A cast-iron trivet is fitted underneath each door opening for handling the work, and stopper bricks are fitted for each chamber.

Heating is effected by Davis Patent Air-Blast Burners for consuming gas at ordinary main pressure with an air blast of 2 lbs. pressure to the sq. inch. The flame does not come into contact with the work; whilst by means of the controls on the burners any kind of flame can be obtained, ranging from reducing to oxidizing.

Size of Chambers: Top, 9¾ in. × 5½ in. × 3⅜ in.
Bottom: 9¾ in. × 5½ in. × 3⅝ in.

Price £30

Other H.S.S. Furnaces from £16:6:6

The Davis Furnace Co., Diamond Foundry, Luton

(Proprietors: The Davis Gas Stove Co., Ltd.)

during the last six months of the financial year. [This is an allusion to the steaming process.] With an increased production of gas of 7½ million c.ft, the quantity of coal carbonized was 1374 tons less than for the previous year; or, calculated on the production per ton of coal carbonized for the year 1916-17, the saving in coal is equivalent to 1912 tons. Arrangements are at present being made to extend the new process of manufacture to both works; and a further improvement in carbonizing results is confidently anticipated when both the carbonizing plants are in operation under the new conditions.

A pleasing feature of the year's working has been the increase in consumption by meter consumers, amounting to nearly 7 million c.ft., notwithstanding the fact that the consumption by cotton factories—due to the operations of the "Cotton Control Scheme"—has decreased by fully 13 million c.ft. as compared with the consumption for the previous year.

The balance at the credit of the appropriation account, amounting to £2793, has been set aside to meet the cost of renewing retorts at the Brierfield works during the ensuing year. The result of the twelve months' working is a gross profit of £21,957, and a net profit of £5016. Carbonizing 27,026 tons of coal, the total make of gas was 406,635,000 c.ft., or 15,046 c.ft. per ton. The unaccounted-for gas, at 4·72 p.ct. of the make, compares with 4·89 p.ct. a year ago. The average consumption per ordinary meter was 31,623 c.ft.; and per prepayment meter, 19,143 c.ft.

RULING AFFECTING GAS SHAREHOLDERS.

Some time ago, Alderman J. H. Bonas, when Mayor of Derby, gave an important ruling affecting the Directors and shareholders of the Gas Company who are members of the Council. He declined to permit them to take part in any discussion or to vote at the meetings of the Council in July and August last on the question of a proposed agreement for the Corporation to supply electricity to the British Cellulose and Chemical Manufacturing Company, Ltd., which involved a scheme of extension of the electricity plant at a cost of £90,000. The ruling was questioned, with the result that the facts were laid before Mr. A. Macmorran, K.C., for him to give a definite opinion. He has upheld the ruling, stating:

In the case before me, the councillors who are shareholders in the Gas Company have an interest, though possibly only an indirect interest, in preventing anything in the nature of competition with the Company in connection with the supply of light, heat, power, &c. It is to the pecuniary interest of the Gas Company to prevent such competition; and on the further information now before me, it does appear that the question before the Council did involve an interest of this kind. The rejection of the proposed contract for a further supply of electricity to the Cellulose Company would make it likely, or at least possible, that the Company would take an additional supply of gas for lighting, heating, or power. This would presumably result in some pecuniary advantage to the Gas Company; for it may be assumed that gas would be supplied at a profit. But it seems to me that the Gas Company might have a pecuniary interest apart altogether from any question of direct profit, if the result of rejecting the proposed contract would prevent the Corporation from reducing the cost of producing electricity, and so competing generally on better terms with the Gas Company. For these reasons, I think the shareholders in the Gas Company had a pecuniary interest in the question of whether the proposed contract should be entered into, though that interest was of an indirect kind; that the councillors who were shareholders had also such a pecuniary interest; and that the opinion of the Mayor was correct in so far as he considered such councillors to be disqualified from discussing or voting on the question whether the proposed contract should be made or not.

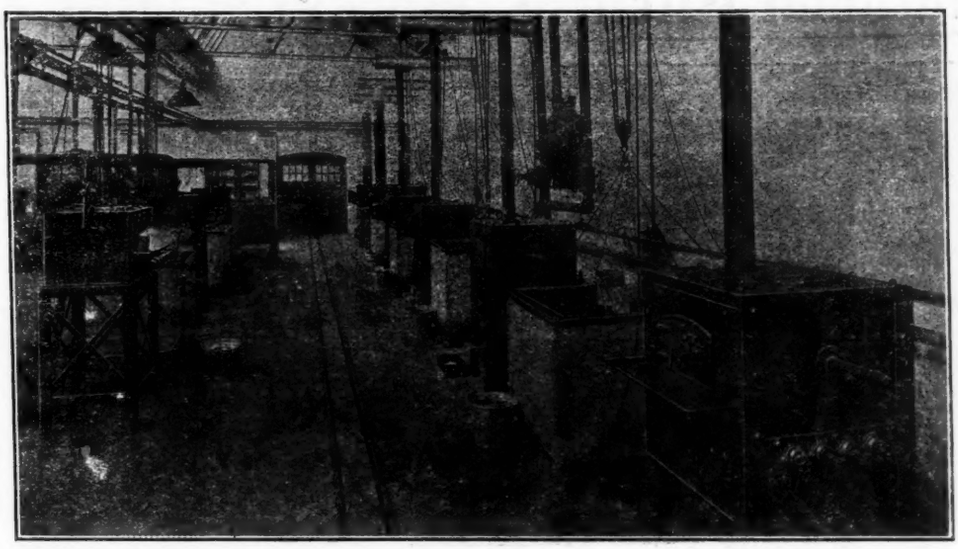
WAGES AWARDS IN THE METER TRADE.

Awards in two cases placed before them in connection with the gas-meter trade have lately been made by the Committee on Production.

One case had reference to a difference between the Gas-Meter Making Employers' Federation and the Navvies, Builders' Labourers, and General Labourers' Union, regarding a claim by the Union for payment to members employed by the firms represented by the Federation of an increase of 50 p.ct. on piecework prices. The men concerned have received certain war advances; but there has been no increase of piece rates since the war. It was stated at the hearing, on behalf of the Union, that the application was limited to commercial work. The Committee's finding is: (1) The war advances now being paid to the men concerned being pieceworkers aged 18 years and over are to cease; and in place thereof there is to be paid an increase of 10 p.ct. on piece prices as they existed at the outbreak of war, with the addition of 13s. a full ordinary week over and above the week's earnings. (2) The increases granted under this award are limited to commercial work. (3) The advances hereby awarded are to be paid as from the beginning of the first full pay after Feb. 25. (4) The amounts hereby awarded are to be taken into account in the calculation of payment for overtime or night duty or for work on Sundays and holidays (where payments at special rates are made for such work); but they are not otherwise to apply to, or affect, present rates of pay. (5) The amounts hereby awarded are to be regarded as war advances, and are to be recognized as being due to, and dependent on, the existence of the abnormal conditions now prevailing in consequence of the war.

The parties to the other reference were the Gas-Meter Making Employers' Federation and the National Amalgamated Union of Sheet Metal Workers and Braziers; and the claim submitted was that the members of the Union in the employ of the firms belonging to the Federation engaged as sheet metal workers on munitions work or gas-meter work should receive a bonus equivalent to the bonus of 12½ p.ct. on earnings granted to certain munitions workers. The award (which does not apply to plain time-workers who are already entitled under

Gas in War Time Industries



No. 2—Machine Tools.

The unprecedented demand for Tools of all kinds has emphasised the remarkable efficiency and reliability of "Richmond" Gas Furnaces for the delicate and exacting heat treating operations involved in manufacture. Illustration shows part of a "Richmond" equipped Tool Hardening Shop. Special furnace lists, specifications and blue prints will be promptly sent to any firm at your request.

THE RICHMOND GAS STOVE & METER CO., Ltd.,
WARRINGTON and LONDON.

Orders Nos. 1061 and 1301 to the 12½ p.ct. bonus) is that the workmen concerned in this reference aged 21 years and over who are paid as plain time-workers shall receive, as from the beginning of the first pay week which followed Jan. 1, 1918, a bonus of 12½ p.ct. on earnings, which shall not alter or become part of their time rates. This shall not apply to any workmen who receive, in addition to their plain-time rates, any bonus or allowance other than such bonus as would be covered by the provisions of section 3, sub-sections (*a*), (*b*), and (*c*), of Order No. 1301, if the men concerned had been within the terms of such Order; provided that if any such bonus as is mentioned in sub-section (*b*) is less than the bonus granted by this award, such first-mentioned bonus shall cease, and in lieu thereof the workmen concerned shall receive the bonus granted by this award. To workmen of 21 years of age and over who are pieceworkers, or are paid on a premium bonus system or any other system of payment by results, a bonus of 7½ p.ct. on their earnings shall be paid as from the first full pay week which followed Jan. 1. Any bonus or war advances which in the case of time-workers have merged in the bonus of 12½ p.ct. on earnings granted to such time-workers under Orders Nos. 1061 or 1301 shall, in the case of pieceworkers, merge in the bonus of 7½ p.ct. on earnings now awarded. Payment of the retrospective amounts due under this award shall be made by the firms as soon as is reasonably convenient. This award does not apply to workmen paid a wage or salary not dependent on time worked, or an upstanding wage or salary which covers overtime or other allowances. In any case where payment has been made to the workmen concerned pending the general consideration of their position in relation to the bonus of 12½ p.ct. or 7½ p.ct., whether by agreement or as a result of arbitration, the amount of such payment shall, in the case of workmen not covered by Orders Nos. 1061 or 1301, merge in the bonus given by this award, and such bonus shall be in lieu of, and in substitution for, any such other payment.

Chambers of Commerce and Coal Economy.—At the annual general meeting of the Association of Chambers of Commerce, the following resolution was carried unanimously: "This Association, recognizing the urgent necessity to increase the productivity of our industries after the war as the chief means to meet the burden of the war debt of the nation, and to maintain high wages for the workers, urge His Majesty's Government: (*a*) To recognize that the public supply of electrical energy for power, light, traction, heat, electro-chemical, and other purposes, is a key industry, insomuch that all other industries are becoming increasingly dependent upon it. (*b*) To hasten the amendment of the legislation which has hitherto hampered its efficient development. (*c*) To ensure the supply at the earliest possible date of ample and cheap electricity for all purposes. (*d*) To conserve our coal resources, the chief wealth of the country, by compelling the exercise of the maximum possible economy in its use for industrial, domestic, and all other purposes.

USE OF GAS FOR MOTOR VEHICLES.

French Practice.

Although full details have been reprinted in France from the British Motor Press and from our own pages of the devices for the use of gas as motor fuel, little has been heard of the means of storage of the gaseous fuel which have been adopted across the Channel. Apparently French engineers do not take kindly to the employment of a flexible container. At any rate, a report of trials undertaken by the Paris Gas Company since November last refers to the "numerous inconveniences" of the system, and states that it has been discarded for the use of a metal receptacle.

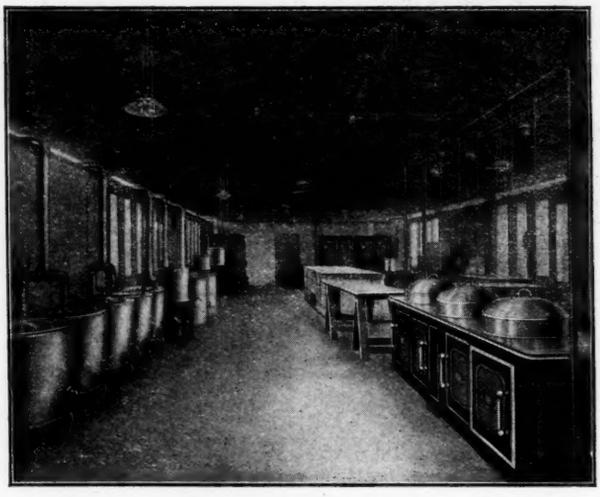
Since Dec. 15 last, a small (half-ton) lorry fitted with an 8 to a 9 H.P. Renault motor has been the subject of running tests with gas stored in weldless cylinders of drawn steel, each of 35 litres (1·23 c.ft.) capacity. These hold gas at the high compression of 100 kilos per sq. cm. (1420 lbs. per sq. in.); and the Company's efforts have been directed chiefly to devising a satisfactory means of delivering the gas to the engine at the atmospheric pressure. This, it is stated, is done first by the use of a pressure-reducer, bringing the compression down to one-tenth—*i.e.*, 140 lbs. per sq. in.—and then, by the operation of a second appliance, supplying the gas at just a little over the atmospheric pressure. The expanded gas is led to the engine and delivered by a simple tap, operated by the hand lever and accelerator pedal, as employed in controlling the air-petrol mixture through a carburettor. The air for the formation of the explosive mixture is supplied partly by the usual air inlet of the carburettor and partly by other small apertures in the tube connecting the gas-tap with the engine; the area of these apertures being regulated by a sleeve. By the provision of a pair of taps, the driver can change from petrol to gas, and *vice versâ*, without stopping.

Tests on long and short routes have shown that petrol motors present no difficulties in being thus fitted for use of coal gas, and that the litre of petrol is replaceable by 1·7 cb.m. of gas of 4700 net calorific power—that is to say, 1 gallon by 270 c.ft. Assuming that the gas is at a compression of 95 atmospheres, the set of four cylinders, which can be stowed away below the floor of the vehicle, will then contain about 470 c.ft.—sufficient for a mileage of from about 50 to 25, according to the fuel consumption of the vehicle. A photograph reproduced in the "Journal des Usines à Gaz," accompanying the foregoing particulars, shows a touring car with limousine body carrying its supply of cylinder-stored gas in a trailer.

The Directors of the Oriental Gas Company, Ltd., have resolved to pay, on May 31, an interim dividend at the usual rate of 3½ p.ct., less income-tax, on account of the year ending on June 30 next.

RELIABLE EQUIPMENTS FOR

National Kitchens, Works Canteens, &c.



WE ARE SPECIALISTS OF MANY YEARS' STANDING IN THE MANUFACTURE OF GAS-HEATED APPARATUS FOR

COOKING, HEATING, & Hot-Water Supply.

LET US ADVISE YOU AS TO THE MOST SUITABLE APPARATUS FOR YOUR PARTICULAR REQUIREMENTS. SMALL OR LARGE NUMBERS OF PEOPLE CAN BE PROVIDED FOR EFFICIENTLY.

WRITE FOR OUR ILLUSTRATED CANTEEN LIST.

ARDEN HILL & CO.

ACME WORKS - - BIRMINGHAM

LONDON OFFICE - - 21, QUEEN VICTORIA ST., E.C. 4

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *April* 29.

The pitch position continues very firm for export; and although the normal shipping season is nearly at an end, further quantities are still required in France. The home demand is also very good; while the fuel mixture of creosote and pitch will absorb a considerable tonnage of pitch. Solvent naphtha is worth quite 4s. 3d. net per gallon in bulk at makers' works. Benzol, toluol, creosote, and carbolic acid remain at the official prices, though occasionally parcels of the two former products are liberated for sale, and in such cases 3d. per gallon extra may be obtained. Anthracene, 40-50 p.ct. continues steady at about 6d. net per unit per cwt., packages included.

There is nothing to report about sulphate of ammonia.

Tar Products in the Provinces.

April 29.

The average values for gas-works products during the week were: Gas-works coal tar, 28s. to 32s. Pitch, East Coast 20s. to 25s. per ton; West Coast—Manchester 18s. 6d. to 19s. 6d., Liverpool 19s. 6d. to 20s. 6d., Clyde 19s. 6d. to 20s. 6d., nominal. Benzol 90 p.ct., North, 10½d. to 11½d.; 50-90 p.ct., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha in bulk, North, 7¾d. to 8¼d. Solvent naphtha, naked, North, 3s. 10d. to 4s. Heavy naphtha, North, 2s. 6d. to 2s. 9d. Creosote, in bulk, North 4d. to 4¼d. Heavy oils, in bulk, North 4¼d. to 5d. Carbolic acid, 60 p.ct. East and West Coasts, 3s. 4d. naked. Naphthalene salts, 90s., bags included. Anthracene, "A" quality, 4d. to 6d. per unit; "B" quality, 1¾d. to 2d.

FROM A MARKET CORRESPONDENT.

Tar Products.

Export business generally appears to have fallen off of late; for the value of all products sent out of the country during March was only £250,214—bringing the total for the first quarter of the year to £727,242. The position in pitch is interesting, as, although shipments from London are held up, quotations remain remarkably firm at up to 55s. for spot. Provincial prices are again harder; and in most cases it is possible to obtain over 26s. per ton. Official restrictions or regulations are anticipated in the very near future; but it is by no means certain that these will have reference to price, although some people incline to the view that a uniform rate of 30s. per ton will be established throughout the country. Of course, Manchester holders would benefit considerably; and prices there have advanced in consequence. In South Wales, quotations are much higher than in the North of England, but still some way behind London, which must of necessity remain a more convenient centre for handling trade, especially for export. Benzol and toluol are going into consumption as fast as produced, and makers are urged to manufacture to the fullest possible capacity, for there is no likelihood of any falling off in the demand. The question of price continues to trouble makers, as official quotations are still much below the cost of production, and considerably under the quotations of 2s. per gallon for benzol and 7s. for toluol current in America. Solvent naphtha is lower in the Provinces, although London still reports business at 4s. 6d. It is now forbidden to sell beyond the end of June, and there is a tendency to await further developments. Heavy naphtha is unchanged. Refined naphthalene still suffers by the absence of export licences. Prices, however, are unchanged, but nominal. Crudes are down again at £6 per ton for the lowest grades. Cresylic acid is quiet at 3s. 3d. to 3s. 6d. per gallon. Anthracene is firm at 6d. per unit, and aniline oil dull at 1s. 2d. per lb. The range of quotations is as follows:

Benzol: 90% London, 1s. 0½d., North 10½d. to 11½d.; 50% North 1s. 4d. to 1s. 5d. naked per gallon.

Carbolic Acid: 60% East and West Coast 3s. 6d. per gallon; crystals 40% 1s. 3d. per lb.

Crude Tar: London 32s. 6d. to 35s. Midlands 27s. to 29s.; North 28s. to 30s. per ton, *ex* works.

Pitch: London 55s. f.o.b.; East Coast, 30s. to 32s. f.o.b.; West Coast, 28s. to 30s. f.a.s.; Clyde 29s.; South Wales 38s.

Solvent Naphtha: Naked London 90-190% 4s. 6d.; North 3s. 9d. to 4s. per gallon; 90-160% naked London 4s. 3d. to 4s. 6d.; North 4s. to 4s. 3d. per gallon.

Crude Naphtha: Naked 30% 8½d. to 8¾d.; North 6½d. to 6¾d.

Naphthalene: Refined £30 to £32 10s.; salts 80s., bags included.

Toluol: Naked, London 2s. 4d.; North 2s. 3d.

Creosote: Nominal, London 4¼d.; North 4d. to 4¼d. (Government price, 75s. per ton f.o.b.—equal to 4¼d. per gallon); heavy oil, 4¼d. per gallon in bulk.

Anthracene: "A" quality, 40-45%, 4½d. per unit; "B" quality, 1¾d. to 2¼d.

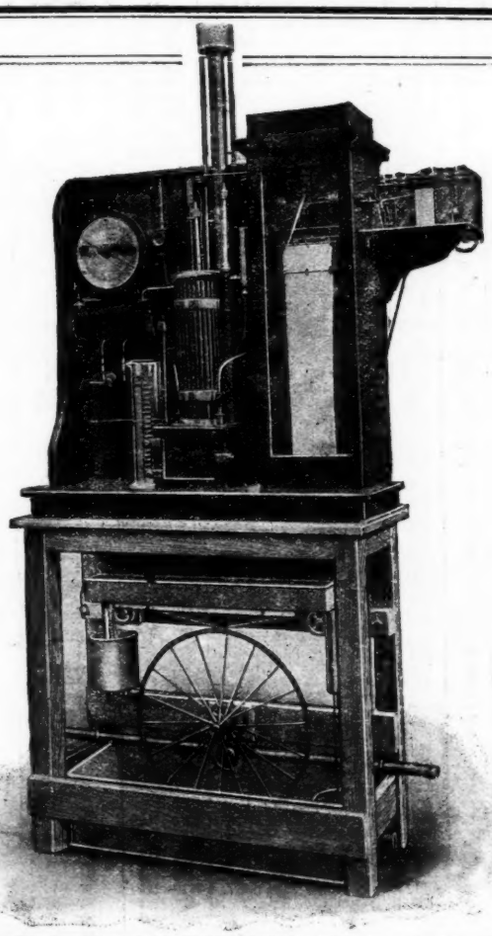
Cresylic Acid: 95%, 3s. per gallon; 97-99%, 3s. 3d. to 3s. 6d. per gallon, casks included, *ex* works London and f.o.b. other ports.

Grease Oils 18° Tw. (naked) £6 per ton f.o.r. makers' works.

Sulphate of Ammonia.

Exports continue on a very small scale; the quantity sent out in the first three months of this year being only 2624 tons, against 31,409 tons and 74,710 tons in the corresponding periods of 1917 and 1916 respectively. The demand continues unabated, and all efforts are being directed to increasing the output. The question of price is still to the fore, and some improved price gradings are looked for as the result of recent meetings; but there is nothing official to report.

American conditions remain about the same as when last reported, with high quotations still the order of the day.



Simmance's
- Patent -
AUTO - CONTROL

regulating the proportional flows of

Two Gases

by means of the

CALORIFIC POWER

of the

RESULTANT MIXTURE.

Alexander Wright & Co., LTD.,
1, Westminster Palace Gardens,
WESTMINSTER, S.W. 1.

New Joint-Stock Companies.—The Peerless Gas-Mantle Company has been registered, with a capital of £5000 in 4500 preference shares of £1 each and 10,000 ordinary shares of 1s. each; and Tar Burners, with a capital of £7000 in £1 shares. The Tarbolton Gas Company has been formed to acquire and carry on the existing undertaking. The capital is £700, in shares of 10s. each.

An Irish "Rest Day."—Thanks to admirable arrangements on the part of the various gas companies, no inconvenience resulted to consumers by the cessation of work in Irish towns (except in the Belfast area) on Tuesday last, as ordered by the Labour Party and requested by the Irish Trade Union Congress, in protest against the proposal to apply conscription to the country. The loss in consumption for power must, however, have been very substantial, as the order was obeyed in all public works and by workshops generally. The labour men express themselves as well pleased with this demonstration of their authority; and it is rumoured, and in some quarters even threatened, that at a later stage in the anti-conscription agitation it may be repeated for a longer period, with a consequent strain on the resources of the gas companies and a probable complete stoppage of gas supplies. One advantage at least resulted from last week's suspension of labour, in the conservation of coal, the shortage of which is keenly felt in some Irish gas-works.

A Gas-Works Flooded.—Heavy floods at Rockhampton (Queensland) gave Mr. E. J. Lord (the Manager of the Gas Company) and his staff an anxious time. When the water reached its highest point, it was 1 ft. 3 in. over the bottom floor of the retort-house; and much of the plant was under water. For some weeks, gas-making operations perforce ceased; but being unable to manufacture gas, Mr. Lord took advantage of the opportunity to connect up new extensions; and with this year's experience to guide him, he proposes to recommend the erection of the new machinery which the Company intend to instal on a much higher level—at all events, out of reach of the mark attained by the recent floods.

Wages of Bye-Product Workers.—Members of the National Union of Cokemen and Bye-Product Workers employed by the Whitwood Chemical Company, Normanton, have received the following awards from the Committee on Production: (1) War advances now paid shall be increased to 3s. 4d. per shift over pre-war rates. (2) Men concerned shall be paid week-end work at the rate of time-and-a-quarter from 2 p.m. Saturday to 6 a.m. Monday. (3) Where a man has completed a shift and is put on work other than shift work, he shall be paid an overtime rate of time-and-a-quarter. (4) Time-and-a-quarter for Bank Holidays; but claim to extend colliery holidays to the firm's work not established.

STOCK MARKET REPORT.

Business on the Stock Exchange last week was much on a par with the condition of the preceding week, in so far as it continued to be disagreeably quiet and quite failed to gather any speeding-up from the birth of the Budget, as some had prophesied would be the case when uncertainties were at rest and we knew the best or the worst to expect. However, although markets were not active, the prevailing tone was firm and cheerful. True, it did not extend to all miscellaneous regions; but the more commanding departments were quite bright. The war news in general was welcomed proudly, especially the gallant feat of arms achieved by our heroic bluejackets on the Flemish coast.

The gilt-edged market was in excellent form. All the War Loans were in strong demand daily; but the 4 p.ct. tax-compounded made the pace too hot at the start, and was checked by profit-snatching. Consols also did well, and Colonial issues were not neglected. Home Rails awoke from their torpor and pushed up quietly and steadily; prior charges being in especial favour. Canadians were not prominent, and Argentines, in spite of good traffics, were dragged down by looming labour trouble.

The Foreign Market presented several good points; the firmness of French loans being noteworthy, and Japanese being in good demand. Spanish and Brazilian did well until another twist in the Exchange disturbed their course. German arrogant demands put Dutch rather out of favour. South Africans on the whole were dullish. In the Miscellaneous Market, Rubber and Oil were steadier than a week ago. Meat concerns were very firm, and Armaments and Munitions in good request; but Breweries were only fair to middling.

Business in the Gas Market has again beaten the record of next-to-nothingness. The three big Companies—Gas Light and Coke, South Metropolitan, and Imperial Continental—with all their millions of pounds of stock, could furnish only a couple of dozen transactions, and all the other companies only another dozen. Seemingly, the market is in a state of bewilderment over the conflict of increasing authoritative demands for gas products, coupled with increasing restrictions upon the output of gas; and no one knows whether to buy or to sell or to do neither.

The Money Market continued easy.

Bargains done for cash during the week were as follows: On Monday, Gas Light debenture 55½, South Metropolitan 63½, 64, 64¼, Cape Town 5 p.ct. 61, Pontypool "Bond" "C" 8 3/32. On Tuesday, Gas Light ordinary 64¼, ditto preference 68, 68¼, Imperial Continental 83. 83½, Primitiva preference 52s. 6d., San Paulo preference 7½. On Wednesday, Brentford preference 79½, Croydon "C" 139½, 140, European 7½, Gas Light ordinary 64, 64¼, 64⅜, ditto preference 68, Imperial Continental 83, 83½, 83⅜, Primitiva 32s. 6d., ditto preference 54s. 4½d. On Thursday, Gas Light ordinary 64¼, 64⅜, 65, ditto maximum 54, ditto debenture 55½, Imperial Continental 82½, 83, Primitiva 33s., ditto preference 52s. 6d., 55s. On Friday, Brighton and Hove original 135, Continental Union 30, European 7½, Gas Light ordinary 64¼, ditto debenture 55¼, Imperial Continental 83, Primitiva 34s., ditto preference 55s.

The Bank rate is 5 p.ct., as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Share.	When Div.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
175,472	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	55—60	..
1,551,868	,,	April 8	2½	4 3/8%	Alliance & Dublin Ord.	59—64	50—55	..
874,000	,,	July 10	4	4%	Do. 4 p.c. Deb.	76—79	58—63	..
280,000	5	April 29	7½	3/6	Bombay, Ltd.	5⅞—6⅜	5—5½	..
50,000	10	Feb. 26	16	13%	Bournemouth Gas and Water { 10 p.c.	29—30	22—24	..
883,110	10	,,	7	7%	B 7 p.c.	15—15½	10½—10⅝	..
115,000	10	,,	6	6/-	Pref. 6 p.c.	13½—14	9—9½	..
159,740	—	—	—	4%	4 p.c. Deb.	..	67—69	..
992,045	Stk.	Feb. 26	14	4½%	Brentford A Consolid.	261—266	76—79	..
734,920	,,	,,	11	4½%	Do. B New	204—209	73—76	..
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	79—84	79½
221,400	,,	June 11	4	4%	Do. 4 p.c. Deb.	91—93	63—65	..
217,380	,,	Feb. 26	11	9%	Brighton & Hove Orig.	208—213	140—145	135
344,200	,,	,,	8	6%	Do. A Ord. Stk.	154—159	95—100	..
530,000	20	Mar. 26	12½	22/6	British	44—45	31—32	..
120,000	Stk.	June 26	4	4%	Do. 4 p.c. Deb. Stk.	88—90	65—67	..
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	51—54	..
100,000	10	—	—	—	CapeTown & Dis., Ltd.	1¾—2⅛	3/4—3/8	..
100,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4—6	7—8	..
100,000	Stk.	June 26	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	58—63	..
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	79—81	..
1,513,280	,,	Feb. 12	5/9/4	41/4	Commercial 4 p.c. Stk.	106—108	67—69	..
560,000	,,	,,	5½	36/8	Do. 3½ p.c. do.	103—105	62—64	..
475,000	,,	June 11	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	52—54	..
800,000	,,	,,	4	—	Continental Union Ltd.	76—79	30—35	30
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	60—62	..
278,400	—	—	—	11¼%	Croydon B and C 7 p.c.	..	155—165	139½—140
—	—	—	—	10%	Do. E	..	..	..
492,270	Stk.	—	6	5½%	Derby Con. Stk.	123—125	95—100	..
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	80—83	..
1,002,180	10	July 29	10	5/0	European, Ltd.	17½—18	7¼—8¼	7⅛—7½
16,298,975	Stk.	Feb. 10	4/17/4	37/4	Gas Light and Coke { 4 p.c. Ord.	98—102	63—65	64—65
2,600,000	,,	,,	3½	3½%	3½ p.c. max.	76—79	53—55	54
4,062,235	,,	,,	4	4%	4 p.c. Con. Pref.	96—99	68—70	68—68¼
4,674,850	,,	June 11	3	3%	3 p.c. Con. Deb.	72½—74½	55—57	55⅛—55½
180,000	,,	,,	10	10%	10 p.c. Bonds	..	..	..
258,740	,,	Mar. 12	5	3½%	Hastings & St. L. 3½ p.c.	87—89	46—51	..
70,000	10	April 29	11	6%	Hongkong & China, Ltd.	16½—16¾	7¼—8¼	..
86,600	—	—	—	9¼%	Hornsey 7 p.c.	..	115—125	..
181,000	Stk.	Mar. 12	7½	7%	Ilford A and C.	151—154	90—95	..
65,780	,,	,,	6⅜	5¾%	Do. B	115—118	70—75	..
65,500	,,	June 26	4	4%	Do. 4 p.c. Deb.	92—94	63—66	..
4,940,000	,,	May 14	9	4½%	Imperial Continental	150—160	82—84	82½—83⅜
1,235,000	,,	Feb. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	65—67	..
235,242	,,	Mar. 12	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	83—87	..
2,498,905	,,	Feb. 26	10	5%	Liverpool 5 p.c. Ord. { A	211—213	82—84	..
					{ B	146—148		
806,088	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	71—73	..
75,000	5	June 11	6	2/-	Malta & Mediterranean	4½—4⅝	3⅜—3⅞	..
250,000	100	April 1	4½	4½%	Met. of Melbourne 4½ p.c. Deb.	99—101	68—99	..
541,920	20	May 28	4	6/-	Monte Video, Ltd.	11½—12	8—8½	..
1,875,892	Stk.	July 29	4½	3 1/8%	Newcastle&Gatsh'dCon.	98½—99½	69—71	..
529,705	,,	June 26	3½	3½%	Do. 3½ p.c. Deb.	82—83	63—64	..
55,940	10	Feb. 26	7/14/0	7/0	North Middlesex 7 p.c.	14—15	9½—10½	..
800,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—122	103—105	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7⅞	2—3	..
60,000	50	Feb. 26	13	10%	Portsea, Island B	128—131	82—87	..
100,000	50	,,	12	9%	Do. C	118—121	72—77	..
52,000	50	,,	10	7%	Do. D	..	..	..
249,980	5	April 29	8	—	Primitiva Ord.	5½—6	1⅝—1⅞	32/6—34/-
499,960	5	June 26	5	2/6	Do. 5 p.c. Pref.	4⅜—5	2⅜—2⅝	52/6—55/-
521,600	100	June 2	4	4%	Do. 4 p.c. Deb.	91—93	76—78	..
—	—	—	—	4%	Do. ,, ,, 1911	..	..	..
846,198	Stk.	June 26	4	4%	River Plate 4 p.c. Deb.	85—87	57—62	..
150,000	10	May 14	6	6/-	San Paulo { 6 p.c. Pref.	10½—11	7¼—7⅜	7⅛
125,000	50	July 1	5	5%	5 p.c. Deb.	47—49	40—42	..
135,000	Stk.	Mar. 12	10	10%	Sheffield A	223—224	174—177	..
209,984	,,	,,	10	10%	Do. B	223—224		..
633,500	,,	,,	10	10%	Do. C	220—222		..
60,000	10	May 28	9	6/-	South African	10½—11½	9—10	..
6,609,895	Stk.	Feb. 10	5/4/0	40/-	South Met. 4 p.c. Ord.	111—113	63—65	63½—64½
—	—	—	—	—	Do. Pref.	..	93—95	..
1,895,445	,,	July 10	3	3%	Do. 3 p.c. Deb.	72½—74½	54—56	..
224,920	,,	Feb. 26	8½	6%	South Shields Con. Stk.	157—159	129—131	..
952,795	,,	,,	6	4½%	S'th Suburb'n Ord. 5 p.c.	114—116	70—73	..
60,000	,,	,,	5	5%	Do. 5 p.c. Pref.	110—112	73—75	..
135,000	—	—	—	4½%	Do. West Kent	..	..	..
187,558	Stk.	June 26	5	5%	Do. 5 p.c. Deb. Stk.	116—118	84—86	..
647,740	,,	May 14	5	3%†	Southampton Ord.	99—102	75—77	..
120,000	,,	Feb. 12	7½	5⅝%	Tottenham District { A 5 p.c.	135—138	90—95	..
782,275	,,	,,	6	4%	B 3½ p.c.	115—117	67—69	..
181,255	,,	June 26	4	4%	4 p.c. Deb.	87—89	61—63	..
189,880	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	60—65	..
236,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	108½—109½	87—88	..
80,000	,,	Feb. 26	8⅜	67/6	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	151—156	108—113	..
255,636	,,	,,	6⅞	52/6	Do. B 3½ p.c.	129—134	80—85	..
108,075	,,	,,	5/17/8	47/8	Do. C 3½ p.c.	110—115	80—85	..
852,000	,,	,,	6⅛	46/8	Wimbledon 5 p.c.	117—122	80—85	..
98,000	,,	,,	6⅛	52/6	Epsom 5 p.c.	121—126	80—85	..
88,416	,,	June 26	3	3%	3 p.c. Deb. Stk.	66—69	49—52	..

† Next dividend will be at this rate.

Record Carbonization at Blackpool.

Mr. William Chew, the Engineer and Manager of the Blackpool Corporation Gas Department, on Friday presented his statement for the year ended March 31, and was warmly congratulated upon the figures he was able to lay before the Committee, who recognized that he has had more than his share of works difficulties to contend with. The revenue account shows that the disposable balance from last year's working is £6647, as compared with £7699 a year ago. The profit is far ahead of the modest estimate, which was £1788 only. The income was £130,720, an increase of £11,207; while the total working expenses were £107,897, against £95,850. The gross balance, therefore, as between income and expenditure, is £22,823; but from this is taken £16,176 in interest on loans and sinking fund. For this year, the expenditure is estimated to be £124,900, the income £145,755, and the net profit £4010. As will be noticed, the expenditure for this year is roughly £17,000 in excess of last year; while the income is expected to be some £15,000 up, partly due to the effect of the recently increased tariffs. The sale of gas last year reached 688½ million c.ft.—the highest consumption in the history of the works, and 110 millions more than estimated. In its manufacture, 60,000 tons of coal were carbonized.

Wages Anomalies at Oldham.

At the last meeting of the Oldham Gas Committee, Mr. Tim. Duxbury (the Engineer) said that, following upon the recent 12½ p.ct. advance in wages, several anomalies had arisen in connection with the work of the department. Yard labourers now received £2 13s. 3d., and general yard foremen £2 19s., a difference of 5s. 9d. [in pre-war days, the difference was 11s.]; stokers £3 11s. 4d., and works assistants £3 16s. [in pre-war days, the assistant received 16s. 3d. more than the stoker]; fitters, blacksmiths, carbonizers, and foremen in the carburetted water-gas shed had been raised from £3 to £4 12s., which compared with the Higginshaw Manager's £4 2s. (*plus* house), Hollinwood £4 16s. (*plus* house), and the Assistant Manager's £3 10s. Retort dressers got £2 16s. and retort setters £2 10s., though the job of the latter was considered to be above that of the former. The Committee decided to consider these anomalies when the full details were available as to duties and pay. It was also reported that a visit had been received from Mr. Hewitt, of the National Union of General Workers, who said that he had sent in an application that the 12½ p.ct. award should be applied to meter inspectors and lamplighters. He also asked how many weeks' back pay the men were entitled to. Oldham, said the speaker, was absolutely right under the award. Lamplighters had nothing to do with it—they were not gas workers, but were under the Lighting Committee. The meter inspectors were subject to a standing wage, and clearly were not entitled to it.

Wellington (N.Z.) Gas Company.—A falling-off in the sales of gas, and an unavoidable deterioration in quality, owing to the abnormal conditions now prevailing, were reported by the Directors when presenting the accounts for the year 1917. In July, the retort-house workers made a demand for increased wages, which the Board did not see their way to concede. What was practically a strike resulted, which disorganized gas manufacture; and for some weeks the output of gas was carried on with great difficulty, and the supply much curtailed. Extreme difficulty also arose in respect to the supplies of coal. Not only did the price reach a much higher figure than in 1916; but for many months past no coal other than that produced in the Dominion was available, and the deliveries scarcely sufficed to keep the works going. The greatly enhanced cost of coal and other materials necessitated a considerable advance in the price of gas. The taxation paid by the Company during the year, amounting to £12,540, was equal to 5¼ p.ct. upon the paid-up capital on the ordinary shares. A dividend of 5 p.ct. for the year was declared, leaving £9484 to be carried forward.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for April 24.]

Nos. 6315—6738.

Allan, A. P.—"Gas cooking-ovens." No. 6405.
Anderson, W.—"Production of oil fuel." No. 6499.
Archer, J.—"Tar stills." No. 6667.
Barrow, L.—"Suction-gas producers." No. 6523.
Brooke, R. M.—"Drains for hydraulic mains used in coal-gas manufacture." No. 6422.
Cady, J. W.—"Gas-engines." No. 6454.
Dempster & Sons, R.—See Brooke. No. 6422.
Dent, J. H.—"Distribution of liquids in gas-scrubbers, &c." No. 6598.
Douglas, D.—"Gas-container." No. 6560.
Jenkins, E. J.—"Gas-cookers, &c." No. 6562.
Kendrick, M.—See Douglas. No. 6560.
Kitson Empire Lighting Company.—"Vapour-burning lamps and stoves." No. 6522.
Morfett, J. E.—"Air-blast and gas burners." No. 6403.
Noblett, A.—See Kitson. No. 6522.
Pease, E. L.—"Manufacture of alkaline cyanide and of ammonia therefrom." No. 6450.
Roxburgh, A. B.—"Gas-furnaces." No. 6605.
Roxburgh, A. B.—"Gas-heated boilers for heating buildings, &c." No. 6606.
Scott, S. M.—See Barrow. No. 6523.
Smith, A. S.—See Jenkins. No. 6562.
Thompson, H. S.—"Gas-mantle holders." No. 6628.
United Alkali Company.—See Dent. No. 6598.
Ward, W. A.—"Packing mantle rings." No. 6561.
Wellington, S. N.—"Distillation of coal, &c." No. 6731.
Wilton, G.—"Treatment of tar for improving its value for fuel purposes and for separation of useful products therefrom." No. 6375.

Applications to Avoid or Suspend Patents or Licences.

Grantee: Clark (*Dellwik-Fleischer Wassergas G. m. b. H.*). "Hydrogen." Applicants: Samuel Cutler & Sons. No. 21,479 of 1908.

Grantee: Messerschmitt. "Hydrogen." Applicants: Samuel Cutler & Sons. Nos. 12,242 of 1912, 12,243 of 1912, 17,691 of 1913, 17,692 of 1913, and 18,028 of 1913.

Rochdale Gas Department.—At a meeting of the Rochdale Corporation Finance Committee on Friday, it was reported that the Gas Department showed a net profit of £6891 for the year to March 31; but none of this was available for the rates, as the year began with a deficit, and as £6000 has by resolution to be placed each year to renewals and administration account. The gross income was £127,209, against £113,366—an increase of £13,843. The expenditure was £120,318, against £109,000. The net profit was £3150 more than last year.

At an extraordinary meeting of Messrs. Stewarts and Lloyds, Ltd., the special resolutions passed at the recent annual meeting, to increase the capital to £3,100,000 by the creation of 850,000 additional deferred shares of £1, to issue 425,000 deferred shares, to amend the deferred shareholders' voting power, and to increase the remuneration of the Directors from £4000 to £8000, were unanimously confirmed.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

Works Manager and Engineer. Worksop Gas Company. Applications by May 7.
Assistant Engineer and Works Superintendent. Oxford Gas Light and Coke Company.
Assistant Chemist. No. 6436.
Working Manager. No. 6443.
Working Manager (Rhayader). Applications to C. H. Holland, Tinsley.
Engineering and Chemical Assistant. Longton Gas Works.

Appointments, &c, Vacant (*Continued*).

Carbonizing Assistant. Brentford Gas Company.
Tester (Gas Meter). No. 6442.

Fuel Oil from Tar (£2000 Award).

Communications to the Controller, Munitions Mineral Oil Production Department, Northumberland Avenue, W.C. 2.

Plant, &c. (Second-Hand), for Sale.

Cast-Iron Connections. Cowdenbeath Gas-Works.
Engine and Exhauster. Sleaford Gas-Works.
Exhauster Plant. F. Summers, Devizes.
Gasholder Columns. Reigate Gas Works.
Photometer. Brecon Gas Works.
Weck Centre Valve. Wolverhampton Gas Works.

TENDERS FOR Coal.

Tottenham District Light, Heat, and Power Company. Tenders by May 6.

OXIDE OF IRON.

O'NEILL'S OXIDE
For GAS PURIFICATION.
LARGEST SALE OF ANY OXIDE.

SPENT OXIDE PURCHASED IN ANY DISTRICT

GAS PURIFICATION & CHEMICAL CO., LD.,
Palmerston House,
Old Broad Street, London, E.C.

"VOLCANIC" FIRE CEMENT.
Resists 4,500° Fahr. Best for Gas-Works.
Andrew Stephenson, Gresham House, Old Broad Street, London, E.C. "Volcanism, London."

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, Oldham, and 45 & 47, Westminster Bridge Road, London, S.E. 1.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS AND GOVERNORS.
Repairs receive prompt attention.
Telephones: 815 Oldham, and 2412 Hop, London.
Telegrams—
"Braddock, Oldham," and "Metrique, Lamb London."

BENZOL PLANTS FOR GAS-WORKS.

BAGLEY, MILLS, & Co., Ltd.,
92, Victoria Street, Westminster, S.W., invite inquiries from all gas-works making 75 million cubic feet and upwards per annum.

OXIDE OF IRON.
SPENT OXIDE WANTED.

BALE & CHURCH, LTD.
33, St. Mary at Hill, London, E.C. 3.
Phone: Avenue 6680.

"TORTO" FIRE CEMENT.

BALE & CHURCH, LTD.
33, St. Mary at Hill, London, E.C. 3.
Phone: Avenue 6680.

"KLEENOFF," THE COOKER CLEANSER.
Tins for sale to Consumers.
In Bulk for Works Use.

BALE & CHURCH, LTD.
33, St. Mary at Hill, London, E.C. 3.
Phone: Avenue 6680.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders to Alter or stop PERMANENT ADVERTISEMENTS should be received by the FIRST POST on Saturday.

Wanted, For Sale, and Tender Advertisements, Six Lines and under 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

United Kingdom: One Year, 23s. 6d.; Half Year, 12s.; Quarter, 6s. 6d. Payable in Advance. If credit is taken, an extra charge of 4s. a year is made.

Abroad (in the Postal Union): £1 7s. 6d., payable in advance.

In payment of subscriptions for "JOURNALS" sent abroad, Post Office Orders or Bankers' Drafts on London only are accepted.

All Communications, Remittances, &c., to be addressed to WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C. 4.

Telegrams: "GASKING, FLEET LONDON." Telephone: Holborn 6857.

ROBERT DEMPSTER & SONS, Ltd., Contractors for Complete CARBONIZING PLANTS and every Description of GAS APPARATUS, ELEVATING, CONVEYING, and TELPHERAGE PLANTS, also STOKING MACHINERY, ROSE MOUNT IRONWORKS, ELLAND.

BRITISH GAS PURIFYING MATERIAL.

ENGLISH BOG ORE AND NATURAL HYDRATED OXIDE OF IRON.
SPENT OXIDE BOUGHT.

BRITISH GAS PURIFYING MATERIALS CO., LTD.
(W. T. P. CUNNINGHAM, Chief Proprietor and Managing Director.)
13, ARCADIAN GARDENS, WOOD GREEN, LONDON, N. 22.
Telegrams: "Bripurimat, Wood, London." 'Phone: Palmer's Green 608.

JAMES MILNE & SON, LTD., (ESTABLISHED 1759.)

SLOT AND ORDINARY DRY METERS.

EXTENSIVE RANGE OF USEFUL GAS WORKS' ACCESSORIES.

EDINBURGH, GLASGOW, and LEEDS.

HUTCHINSON BROTHERS, Ltd., FALCON WORKS, BARNSLEY.

MANUFACTURERS OF
GAS METERS (Ordinary and Prepayment),
"FALCON" INVERTED LAMPS and SQUARE LANTERNS for Street Lighting,
INVERTED BURNERS and CONVERSION SETS for Street Lamps.

ALDER AND MACKAY, LTD. (ESTABLISHED 1850.)

WET AND DRY METERS,
SLOT AND ORDINARY.
STREET LAMPS AND AUTOMATIC CONTROLLERS,

EDINBURGH.
(See p. 173.)

SULPHATE OF AMMONIA SATURATORS and all LEAD and TIMBER WORK in connection with Sulphate Plants.
We Guarantee promptness with efficiency for Repairs.
JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON.
Telegrams—"SATURATORS BOLTON." Telephone 0848.

SEND your inquiries for Carburetted HYDROGEN AND BLUE WATER-GAS PLANT, also TAR DEHYDRATING PLANT and other GAS-WORKS APPARATUS to—

BALE AND HARDY,
39, VICTORIA STREET, WESTMINSTER, S.W. 1.

"FERROX." "FERROX." "FERROX."

A BRITISH Oxide Cheaper and Better than Bogore. 35 per cent. Water, 75 per cent. Ferric Hydrate. For Sale outright or on Loan.
OXIDE LIMITED, Brentford, MIDDLESEX.

SPENCER'S Patent Inclined HURDLE GRIDS.

THE very best Patent Grids for Holding Oxide Lightly,
See Illustrated Advertisement, Feb. 19, p. 371.

MEWBURN, ELLIS, AND PRYOR.

CHARTERED PATENT AGENTS AND TRADE MARK AGENTS,
70, Chancery Lane, London.
Telegrams: "Patent London." 'Phone: 248 Holborn.
And 8, St. Nicholas Buildings, Newcastle-on-Tyne.

SULPHURIC ACID.

SPECIALLY prepared for the manufacture of SULPHATE OF AMMONIA.
SPENCER CHAPMAN & MESSEL, LTD.,
with which is amalgamated WM. PEARCE & SONS, LTD.
Mark Lane, LONDON, E.C. Works—SILVERTOWN.
Telegrams—"HYDROCHLORIC, FEN, LONDON."
Telephone—1588 AVENUE (3 lines).

ENQUIRIES SOLICITED.

FOR Gas-Works Plant of Every Description; also SULPHATE OF AMMONIA and SULPHUR RECOVERY PLANTS.
C. & W. WALKER, LIMITED,
DONNINGTON, NEWPORT, SALOP.

J. E. C. LORD, Ship Canal Tar-Works' Weaste, Manchester. Pitch, Creosote, Benzols, Toluol, Naphtha, Pyridine, all kinds of Cresylic Acid, Carbolic Acid, Sulphate of Ammonia, &c.

JOHN RILEY & SONS, Limited, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of Special SULPHURIC ACID, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 60 years. Reference given to Gas Companies.

GAS-WORKS requiring Extensions should Communicate with FIRTH BLAKELEY, SONS, AND CO., LIMITED, Dewsbury, who make a Speciality of Catering for the Smaller Gas Concerns. Prices Reasonable; quality and results, the best. Satisfaction Guaranteed.

CORRESPONDENCE TUITION in GAS ENGINEERING for City and Guilds Institute Exams. (Preliminary and Final). Successful Results. Low Fees.
PENNINGTON'S ENGINEERING TUTORS, 254, Oxford Road, MANCHESTER.

THE Directors of the Worksop Gas Company invite Applications for the Position of WORKS MANAGER and ENGINEER at once (output 50 Million cubic feet). Good House and large Garden, Gas, Water, and Taxes free. The successful Candidate will be required to Devote his Whole Time to the Duties of the Company.
Applications, by letter, stating Salary required, Age, Qualifications, and previous Experience, and enclosing *copies* of Two recent Testimonials, to be sent to the undersigned not later than Tuesday, May 7, 1918.
FRANK LUKE,
Secretary.
Offices: Church Walk, Worksop.

THE County Borough of Stoke-on-Trent, Gas Department, require the services of ENGINEERING and CHEMICAL ASSISTANT. Salary, £150 per Annum.
Apply, stating Age and Experience, together with *Copies* of Two recent Testimonials, to A. MACKAY, Chief Engineer and General Manager, Gas Offices, LONGTON, Stoke-on-Trent.

BRENTFORD GAS COMPANY.

CARBONIZING ASSISTANT.

WANTED—a Carbonizing Assistant for one of the Stations of the above Company. Applicant must have thorough knowledge backed by Practical Experience. General Experience also desirable.
Write, stating Qualifications, to ALEX A. JOHNSTON, Engineer and Manager, Gas Company, BRENTFORD.

WANTED — Assistant Chemist for Tar Works Laboratory in Metropolitan Area.
Apply, by letter, to No. 6436, care of Mr. KING, 11 Bolt Court, FLEET STREET, E.C. 4.

OXFORD GAS LIGHT AND COKE COMPANY.

THE above Company require the Services of an ASSISTANT ENGINEER and WORKS SUPERINTENDENT.
Apply, stating Age, Experience, and Salary required (House provided Rent Free), together with *copies* of Two recent Testimonials, to W. E. CATON, General Manager and Engineer, Gas-Works, OXFORD.

WORKING Manager wanted for the Rhayader Gas-Works, Mid Wales. House, Coal, and Gas provided.
Apply, by letter, giving Age, Qualifications, and Wages required, to C. H. HOLLAND, Tinsley, SHEFFIELD.

WANTED—A Working Manager for a Three Million Works near Harrogate.
Apply, by letter, stating Wages required, to No. 6443, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

TESTER Wanted by Gas Meter Manufacturer, fully Competent to Take Charge of Test Room. Good Wages Paid for Smart Man.
Apply, by letter, to No. 6442, care of Mr. KING, 11, Bolt Court, FLEET STREET, E.C. 4.

GAS Apparatus for Sale. — Retort IRONWORK, HYDRAULICS, Pipe and Annular CONDENSERS, Livesey and Rotary WASHERS, EXHAUSTERS, TOWER SCRUBBERS, PURIFIERS, GASHOLDERS, TANKS, PUMPS, ENGINES, &c., in Stock. State requirements.
FIRTH BLAKELEY, SONS, AND CO., LTD., CHURCH FENTON, nr. Leeds.

FOR SALE—Ten Cast-Iron Gasholder COLUMNS, with Base-Plates and Girders Complete for Erection.
Four 13 ft. 6 in. by 7 in. to 6 in. Tapered.
Six 16 ft. 9 in. to 7½ in. Tapered.
To be seen at the Gas-Works, Reigate. Apply to G. MEAD-ROBINS, Engineer.

FOR SALE—One 18-in. Weck Centre VALVE, little used. Condition as New.
Can be seen by appointment on Application to P. G. WINSTANLEY, WOLVERHAMPTON GAS COMPANY.

FOR SALE—60 in. Standard Letheby-Bunsen PHOTOMETER Complete. In Splendid Condition (New 1912). Inspection and Offers Invited.
Apply, the MANAGER, Gas-Works, BRECON.

EXHAUSTER Plant by the Bryan Donkin Company, three years old, consisting of 2 H.P. National Gas Engine and Exhauster, with Governor, and all Pipe Connections and Cocks. Complete and in Good Working Order. Suit small town.
To be seen at F. SUMMERS, The Green, DEVIZES.

FOR SALE — One Combined Engine and EXHAUSTER, 10,000 c. ft. per Hour, with 6-in. Inlet and Outlet Disc Valves, Steam Regulator, and Throttle Valve.
Apply for Particulars to H. WIMHURST, Gas-Works, SLEAFORD.

FOR SALE.—Set of 12-in. Cast-Iron CONNECTIONS forming Inlet and Outlet for Exhauster, including 12-in. Self-Acting Bye-Pass Valve and 8-in. Compensator Valve, all complete and in good order.
Full Particulars from J. B. SCOTT, Gas-Works, COWDENBEATH.

GAS PLANT for Sale. — We can always offer New and Second-Hand Gas Apparatus, including Retorts and Fittings, Condensers Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
FIRTH BLAKELEY, SONS, AND CO., LTD., CHURCH FENTON, near LEEDS.

SOLE MAKERS OF THE "CONTINENTAL" & COAL WASHER. H. & J. DEMPSTER, 34, Victoria St., S.W. 1. MANCHESTER.